GAS JOURNAL

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PURPOSE AND FULFILMENT

IN this first week of 1949, *one hundred years after the launching of the* "GAS JOURNAL" *and at a time of active transition of the gas industry from private and municipal ownership to ownership and control by the State, we re-publish here a leading article from one of our early issues (Jan.* 10, 1853) *which so aptly, in spite of the passage of a century, expresses thoughts that, with a current context, are in our mind to-day.*

"It has apparently become an established custom with the great bulk of our editorial brethren to offer at this season of the year, in addition to many hopes, fears, and promises, a few explanatory remarks concerning the past and future—or, in plain words, to 'report progress.' We comply with this custom on the present occasion all the more readily from the pleasure it affords us, since we have to acknowledge many favours, to return thanks for much kindness, to announce that our hopes are as high as our fears are low, and to assure our friends that their kindness is not only appreciated but is yielding good fruit after its kind. In fact, our success is now established, and surpasses not only the merit of our endeavours but even the fairest dreams of our imagination.

"When, some few years ago, this JOURNAL was first projected we were told on all sides—'No one will support you; there is no room for such a publication; the gas companies want no such thing; they are doing well; they fear the exposure of their monopoly; with them "ignorance is bliss." You will fail certainly.' Such were the forbidding admonitions even of the tongue of friendship.

"But we had resolved upon our course and were determined to ascertain by nothing short of practical experience whether the diffusion of substantial information in the plain, honest, and homely language of truth would not in time bring forth its own reward.

'"Tis not in mortals to command success;
But we'll do more, Sempronius—we'll deserve it.'

"On this principle we tried; on this principle we have succeeded. And herein lies the simple secret of our prosperity. To this principle we are bound, and, unscared alike by threats or allured by bribes, we quietly hold on the even tenor of our way and laugh to scorn the puny malevolence of our enemies. Nor shall any inducement lead us for one moment from the now habituated and beaten path of honest independence. We may err, we may be prophetically incorrect in our views; but nothing shall intimidate us from the free expression of our opinion, for that opinion is never formed hastily, nor heedlessly published. It is in every instance the calm unbiased result of an impartial investigation into the merits of the case—the verdict, in fact, not of one, but of several heads; for we have been fortunate enough to secure the assistance and co-operation of many, both in this and other countries, who may well rank in a practical and scientific view as second to none in skill and knowledge concerning the manufacture of gas.

"Thus circumstanced, we feel both confidence and pleasure in claiming the continued patronage of the gas world: confidence, from an innate conviction that we have merited that patronage; and pleasure, from perceiving that it has been freely accorded to us."

At the beginning of a second century of continuous publication, at the beginning of a year which, we hope, irrespective of nationalization, will see no dimming of that enthusiasm and that determined effort which have combined to develop the gas industry since its foundation, we still feel circumstanced to claim the goodwill, the co-operation, the interest of our readers.

THE COMMERCIAL AND INDUSTRIAL LOAD

INDUSTRIAL and commercial demand for town gas grows apace; demand, in fact, far outstrips supply. Wartime experience of the use of gas brought further confirmation to industrialists regarding the benefits of a clean, flexible, controllable fuel. In 1946, the sales of industrial gas amounted to 88,718 mill. cu.ft., of "commercial" gas, 50,684 mill. cu.ft. The provisional figures for 1947, as given by the Ministry of Fuel and Power, are 92,139 mill. cu.ft. and 53,440 mill. cu.ft. respectively. During the last financial year the gas sold for industrial purposes by the Birmingham Gas Department was practically equivalent to the total load of the undertaking in 1911. Commercial and industrial gas sales at Stoke-on-Trent in 1948 showed an increase of nearly 500 mill. cu.ft. The tendency is to modernize heat applications, to adopt speedier methods, to eliminate the need for employing certain types of labour, and to improve factory amenities in general. Gas is an obvious answer to requirements. This attitude on the part of industrialists and manufacturers has been brought about by the continuous efforts of the gas industry for many years. As an instance: the industry has provided excellent advisory service through its Industrial Development Centres; in collaboration with the makers of industrial gas equipment, it has encouraged and achieved co-operation with the gas user. This endeavour must be continued and extended.

The potential industrial and commercial gas load is enormous. It offers great possibilities to those adequately trained to cope with its development, which calls for an approach different from that needed for domestic sales. Personnel engaged in this development should have knowledge of the many trade processes and engineering problems involved. The problem of training has become more pronounced with the break in the education of young men caused by the incidence of the compulsory period in the Services and by the rehabilitation of ex-Service personnel in civil life. There are also cases of members of office staff dealing with commercial and industrial matters, but having no practical contacts with consumers and their process applications, and there are the maintenance fitters and the students. With a view to giving an indication of the scope of the utilization of gas in industry, and guidance on how some of the problems can be approached, we start in our issue to-day a series of articles covering the fundamentals of this specialized field of fuel technology. The series is being contributed by Mr. F. Dickinson, Industrial Gas Engineer to the Newcastle and Gateshead Gas Company, and will incorporate essential technical and practical information. From all points of view the author is well qualified by experience to appreciate fully the needs of those for whom he writes. We are sure that the articles are opportune and will serve an excellent purpose in the development and consolidation of the industrial and commercial gas load and in helping those engaged in the task now and those who will be engaged in the future in this vast and wholly interesting and promising field.

ISLE OF WIGHT PRESSURE STORAGE

THE Isle of Wight, with its six gas undertakings supplying a total area of some 147 sq. miles, presents a picture in miniature of the integration problems which confront the industry in many other parts of Britain to-day. As recently as 17 years ago the three sister seaside resorts, Shanklin, Ventnor, and Sandown, each had its own separate gas company. In 1932 a Special Order was obtained to transfer the Ventnor undertaking to Shanklin, and five years later the Sandown Gas and Coke Company's undertaking was transferred under another Special Order to what was then the Shanklin and Ventnor Gas Company, and the name was changed to the East Wight Gas Company. The advantages of concentrating manufacture in the largest and most up-to-date of the three works were almost immediately evident, and the demand for gas throughout the integrated area grew until, in 1945, it became obvious that from the distribution point of view some additional provision was required to cope with the peak demands.

While Shanklin itself is supplied mainly through a low-pressure system, over two-thirds of the gas sold by the East Wight Company is distributed from the Shanklin Works through a high-pressure mains system. Like other popular holiday resorts the area experiences its heaviest gas demands between June and September and the daily peak periods are the breakfast, lunch, and dinner cooking times. Following a detailed study of the incidence of peak demand and the capacity of the distribution system the best solution of the problem of meeting the demand was found to be the incorporation of a pressure holder installation in the existing high pressure system. The manner in which the work has been carried out is the subject of a particularly interesting article on pp. 35-37 of this issue. The capacity of the plant necessary to meet the demand was ascertained without much difficulty, but the selection of the site for the holder was not so simple owing to many conflicting factors. The ultimate decision to install the compressors and the pressure holder on the site of the Shanklin Works was amply justified within a few days of setting the installation to work. The storage vessel, the first site-welded and site-radiographed holder, has a capacity of 188,000 cu.ft., and apart from its engineering and welding features the holder and its associated compressing and governing gear have provided an example of how pressure storage and an extended pressure distribution scheme have brought better service to neighbouring towns and distant consumers.

Mr. L. G. Payne, Engineer and Manager of both the East Wight and the Ryde Gas Companies, between whom there is the closest co-operation, was responsible for the scheme from start to finish, and the carrying out of the work was in itself an example of team work at its best. The builders of the pressure holder were entrusted with the responsibility for all the work involved in the construction of the holder, its foundations, the compressors and governors, the necessary building and other ancillary work. Due credit is given to the numerous firms who contributed their own specialized products and services to a scheme which possesses many novel features, and which should afford useful guidance to others who will have to face similar problems in the new era.

GAS AREA CHANGES

Slight changes in the boundaries of the North Thames and South-Eastern regions of the Area Gas Boards are shown in the final maps now displayed at 12 points throughout the country. Statutory Instrument No. 2773, The Gas (Areas of Area Boards) Order, 1948, made by the Minister of Fuel and Power under the Gas Act lays down that these shall be the final areas of operation of the Gas Boards. In the draft map the principle of making the Thames the boundary between the North Thames and South-Eastern Areas was adopted. This has been dropped in the final map so that the North Thames Region now includes all the area of supply of the Gas Light and Coke Company, and the South-Eastern Region all the area of supply of the Wandsworth and District Gas Company, despite the fact that the boundaries of these companies cross the river in places. This means that the Gas Light and Coke Company's supply area in Battersea, Lambeth, and Southwark moves back into the North Thames Area, and that the Wandsworth Company's supply area in the parish of Shepperton moves back into the South-Eastern Area. The changes have been made after discussion with the companies concerned.

NEW COAL PRICES COMING

A new scale of coal prices—relating them to calorific values and fluctuations in demand—is to be brought into force by the National Coal Board. The changes were foreshadowed in the Board's last annual report which pointed out that flat rate increases made during the war had resulted in an unwieldy price structure with some coals doubling their price while others had

tripled. A first change under the new system was made last July when the prices of untreated smalls were adjusted. No date has been fixed for announcement of the new charges, but the Board's research committee, which has been working on the problem for some months, is continuing its review. The annual report of the N.C.B. pointed out that during the war prices were controlled by the statutory selling scheme and when it was necessary to raise them this was done by administrative order. To correct the anomalies brought about by this policy, the Board decided that a new classification of coals which paid due regard to quality, ash content, and so on was necessary.

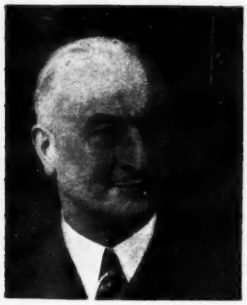
The 1949 Edition of the "*Gas Journal*" Calendar and Directory is in course of despatch to subscribers

Personal

Retirement of Mr. J. F. Davies

As from Dec. 31 last, Mr. J. F. DAVIES, Chairman of Radiation, Ltd., since 1941, retired from the Chairmanship and the Board of the Company.

Mr. Davies has played an exceptional part in the remarkable growth of the gas appliance industry of this country during the last half-century. He joined the staff of John Wright & Co., Ltd., some 56 years ago, in the closing years of Queen Victoria's reign, when great advances were in the making. He graduated through the London Managership and Sales Managership of John Wright and Eagle Range Co., Ltd., to the General Managership in 1912, and was elected a Director in 1914, Managing Director in 1919, and Chairman in 1930. In 1919, in conjunction with Richmonds Gas Stove and Meter Co., Ltd., and Davis Gas Stove Co., Ltd., John Wright became a member of Radiation, Ltd., of which Mr. Davies was one of the original Managing Directors.



Mr. J. F. Davies

Dr. Harold Hartley

In 1937 Mr. Davies became Deputy-Chairman of Radiation, Ltd., and was elected Chairman in 1941 upon the death of Sir Herbert Smith, who had succeeded Mr. H. James Yates, the first Chairman, in 1939. After Mr. Yates's retirement, Mr. Davies became recognized as the leading spirit in Radiation, Ltd.; he has piloted the ship through some of the most difficult years of its history.

During his years of executive rule, Mr. Davies's keynotes have been quality and service. He set extremely high standards for the appliances produced in the Radiation organization and especially so in the Birmingham group. "Service," in his exposition of the term, is extended through the undertakings who are the first recipients, to the individual householders themselves who use the products. He has always maintained that both undertakings and users should be put to as little trouble as possible, and anything which reduced servicing attention in an appliance was always welcomed wholeheartedly. To further his ideals of service and quality, he personally was responsible for the formation of the Radiation Technical Service Section.

Mr. Davies has long been interested in the export market. During the first decade of the existence of Radiation, Ltd., growing business in Australasia led him to sponsor in 1930 the formation of Radiation (New Zealand), Ltd., from the nucleus of an existing appliance firm. He had felt honoured to entertain, in 1926, at the Birmingham Works, Mr. S. M. Bruce, Prime Minister of Australia, and Mrs. Bruce. Other interests abroad, in South Africa this time, were reflected in the visit of the Hon. J. W. Downie, High Commissioner for S. Rhodesia, to the works in 1932.

Fundamental technical investigation has always received every encouragement from Mr. Davies. He was justifiably proud of the new laboratory and office accommodation opened at Aston in 1936, to which the staff of Radiation House, London, moved in 1939. The period of his Chairmanship has coincided with the far-from-easy times of the second world war and the succeeding peace, and has been heavy with responsibility in seeing that not only should existing commitments be guided aright in full prosecution of the efforts of the times, but also that the future should not be neglected. The cessation of hostilities, with its shortages of labour and of supplies, has not eased the burden and has frustrated return to pre-war levels, but Mr. Davies has, nevertheless, fostered the provision of increased research and development facilities which are nearing completion in extra accommodation adjacent to the existing laboratories. It is expected that these will provide opportunity for still further advances in domestic appliance design.

Mr. Davies is a member of the Grand Council of the Federation of British Industries, of the Management Board of the Engineering and Allied Employers' Association, and of the Council of the Birmingham Chamber of Commerce. He was a member of the Board of Governors of the Birmingham Children's Hospital, for which his attention was always most actively engaged, until the advent of nationalization in July, 1948, brought a long period of service to a close.

Dr. HAROLD HARTLEY, Technical Director of Radiation, Ltd., a Past President of the Institution of Gas Engineers and of the British Cast Iron Research Association, has been appointed Chairman to succeed Mr. Davies. From 1938 to 1945 he was Chairman of the Council of the Cast Iron Research Association, and he has been a member of the Council of the Gas Research Board since its inception.

Born in the Isle of Man, Dr. Hartley was educated there and at Manchester Grammar School and Manchester University. Studying under the late Professor H. B. Dixon, he won First-Class Honours in Chemistry in 1907, and took the degree of D.Sc. in 1919. A Woodiwiss Exhibitioner and Gartside Scholar of the University, he travelled in Norway and Canada during 1908-9, studying power production for electro-chemical industries. During part of the time in Canada he did research work at McGill University, Montreal, and from 1909 to 1912 was Gas Research Fellow at Leeds University.

Dr. Hartley entered the domestic appliance industry in 1912 when appointed Chief Chemist to Richmonds Gas Stove Co., Ltd., Warrington. On the formation of Radiation, Ltd., in 1919, he became head of the Research Department and has been executive head of the Central Research Laboratories since their foundation in 1925. Following the transfer to Birmingham in 1939, Dr. Hartley was elected a member of the Board of Directors and appointed Technical Director.

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Mr. STUART P. PEPIN, Engineer and Manager of the Jersey Gas Company, has been appointed to a seat on the Board, with the title of Managing Director.

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Mr. JAMES CAMPBELL, B.Sc.(Eng.), A.M.I.Mech E., Works Superintendent, Romford Gas Company, has been appointed Engineer and Manager of the Montrose Gas Company.

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Mr. H. SHACKLETON, Engineer and Manager of the Gainsborough U.D.C. Gas Department, has been elected President of the local branch of the National Association of Local Government Officers.

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Following the promotion of Mr. C. Hindle, Works Superintendent, to the position of Deputy Engineer and Manager of the Darlington Gas Department in succession to Mr. W. A. Pask (now Deputy Engineer and Manager at Leicester), Mr. N. HENDERSON, Chief Engineering Assistant, has become Works Superintendent, and Mr. H. A. WOOD, Junior Engineer, has been promoted to the post of Chief Engineering Assistant.

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Mr. D. BROWNE, Assistant Engineer and Manager of the Newton-le-Willows Gas Department, has resigned, and is taking a position in the motor industry. Mr. W. A. WOOLSTENCROFT, Assistant Engineer and Manager to the Atherton Gas Department, has been appointed as his successor. Mr. Woolstencroft was previously Technical Assistant at the Leigh Gas Department and had experience as a Research Chemist with Messrs. Sutcliffe Speakman & Co., Ltd., of Leigh.

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The Ministry of Fuel and Power has announced the membership of the eight District Valuation Boards which are to distribute compensation in the various coalfields under the Coal Industry Nationalization Act. The global compensation sum of £164,660,000 announced last August has yet to be allotted by the Central Valuation Board between the coalfields. The names of Sir ERNEST SMITH and Dr. G. E. FOXWELL appear on six of the eight Boards. In addition to the collieries, which come under the total compensation agreed between the Ministry and the Mining Association, there are the coke ovens, in respect of which an additional sum is to be paid. Coke oven managers and past

owners are, therefore, interested to note that two independent technical men are joining the District Valuation Boards which have to consider coke oven compensation. It is understood that the task of Sir Ernest Smith and Dr. Foxwell is primarily that of dealing with the carbonization assets, *i.e.*, the coke ovens, which were taken over on vesting date.

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Alderman GEORGE CLARK, M.I.Mech.E., J.P., Managing Director of the Bryan Donkin Co., Ltd., and Chairman of the Chesterfield Local Employment Committee, received the distinction of O.B.E. in the New Year Honours. The M.B.E. was bestowed on Mr. A. L. HIGHAM, Engineer and Manager of the Hull Station of the British Gas Light Company.

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Owing to ill-health, Mr. VICTOR BLAGDEN has been compelled to relinquish all his business activities. He has, therefore, resigned his Directorships of Victor Blagden & Co., Ltd., and Pitch Marketing Co., Ltd., of which Companies he was Chairman since their inception. He was also a Director of Burt, Boulton, & Haywood, Ltd., and President of the British Chemical and Dyestuffs Traders' Association, Ltd., for many years.

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As from Jan. 1 Mr. C. H. CHESTER has relinquished his appointment as Chief Engineer, General Manager, and Secretary of the Swindon United Gas Company, on taking up his duties as Chairman of the South Western Area Gas Board. For the time being the temporary headquarters of the South Western Area Gas Board will be at 43, Regent Street, Swindon. Mr. G. F. OLIVER, Engineer, has been seconded as Planning Engineer to the Area Board. All communications having reference to Swindon United Gas Company area should be addressed to the appropriate new officers, who are as follows: Mr. W. B. CLARIDGE, Acting Manager; Mr. P. J. WHITEHEAD, Acting Engineer; Mr. H. WHEELER, Acting Secretary; Mr. F. C. HIGGS, Acting Assistant Engineer; Mr. J. D. BUTLER, Acting Second Engineer. The head offices of the Company will be at Gorse Hill Gas-Works, Swindon, for all works and distribution matters, with accounts in part of 43, Regent Street, Swindon.

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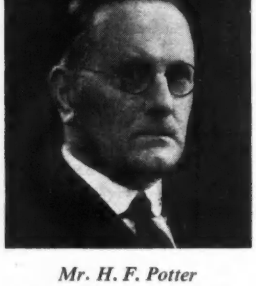
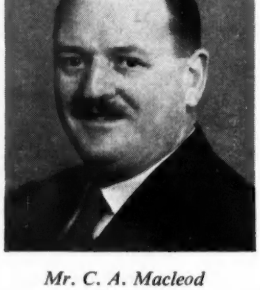
Messrs. R. & A. Main, Ltd., announce that Mr. C. A. MACLEOD has been appointed Sales Manager for the territory served by their Southern (Edmonton) Works, which comprises all Southern England up to a line running from Aberystwyth in the West to the Wash in the East. Mr. Macleod has served with the Company for 29 years, and for the past three years has been Assistant



Mr. H. F. Potter



Mr. C. A. Macleod

Sales Manager. He is well-known in the East and South-East Counties, both as a representative and as an accomplished golfer. Mr. H. F. POTTER, now in his fifty-second year's service with the Company, has been Sales Manager for this territory for over 30 years. The new appointment will leave him free to attend to his other activities on behalf of R. & A. Main, Ltd., for whom he recently travelled extensively abroad investigating various export markets.

CALENDARS AND DIARIES

We cordially appreciate the seasonable greetings which have accompanied the following diaries and calendars and take the earliest opportunity in the New Year to reciprocate the kind wishes expressed:

Alpha Engraving Co., Ltd., desk diary for engagements and memoranda; British Vacuum Cleaner and Engineering Co., Ltd., pocket diary, including useful technical data, and wall calendar; R. and J. Dempster, Ltd., set of 1949 date cards for use in existing calendar case; Drakes, Ltd., refill pocket diary, with indexed memorandum pages; Standard Furnace and Setting Co., Ltd., pocket diary with business man's section and a series of coloured maps; Stewarts and Lloyds, Ltd., semi-perpetual desk calendar with monthly change cards: Dunlop and Ranken, Ltd., the South London Advertiser, and Westwood and Wrights, Ltd., wall calendars.

GAS COUNCIL HEADQUARTERS

It is officially announced that as from Monday last, the address of the Gas Council is 1, Grosvenor Place, London, S.W.1, and the telephone number is SLOane 5457.

Letter to the Editor

"Gas Distribution Engineering"

DEAR SIR,—I should like to call attention to a drawing error in the text-book "Gas Distribution Engineering," by R. N. Le Fevre, which you recently published.

On pages 76 and 77, diagrams 69 and 70 depict a station governor loaded by air pressure and inlet gas pressure respectively. The levels of water in both outer chamber and bell are shown incorrectly. Actually the levels illustrated should be reversed.

Obviously the experienced gas engineer will recognize it to be a drawing error, but it may cause some confusion to the student.

Yours faithfully,
R. STEVENS.

17, Eckington Gardens,
New Cross,
S.E.14.
Dec. 14, 1948.

Mr. Stevens's letter has been referred to Mr. R. N. Le Fevre, who replies as follows:

Thanks are due to Mr. Stevens for his kindness in drawing attention to the errors in Figs. 69 and 70 of my book "Gas Distribution Engineering."

The water levels in the main chamber of both governors should, of course, be reversed in both types as the pressure outside the bell is greater than the pressure inside the bell. These diagrams were developed from Fig. 68 by tracing one from another and the error occurred in tracing the water levels shown in Fig. 68.

Watson House,
London, S.W.6.
Dec. 20, 1948.

Diary

Jan. 6.—**Women's Gas Council**: Headquarters Members, Gas Industry House, 3 p.m.

Jan. 8.—**Scottish Junior Gas Association (Eastern District)**: "Industrial Gas Appliances and Utilization," A. H. Holden, B.Sc. (British Gas Furnaces, Ltd., Chesterfield), Edinburgh.

Jan. 10.—**London and Counties Coke Association**: Technical Committee, Gas Industry House, 2.30 p.m.

Jan. 10.—**Women's Gas Council**: Executive Committee, Gas Industry House, 1 p.m.

Jan. 11.—**Federation of Gas Employers**: Central Committee, Gas Industry House, 11.30 a.m.

Jan. 11.—**British Gas Council**: Central Board, Gas Industry House, 2.30 p.m.

Jan. 12.—**B.G.C. Domestic Development Committee**: Technical Sub-Committee, 10.30 a.m.; Main Committee, 2.30 p.m., Gas Industry House.

Jan. 12.—**Eastern Junior Gas Association**: "Gas-Works Paints and their Application," E. M. Pool (Technical Representative, Donald McPherson & Co., Ltd.), Stamford.

Jan. 14.—**London and Southern Junior Gas Association**: "Some Problems of Heating and Hot-Water Supply in the Gas Industry," W. F. Moore, Assoc.I.H.V.E. (Wandsworth and District Gas Company), Gas Industry House, 7 p.m.

Jan. 14.—**Scottish Junior Gas Association (Western District)**: Distribution paper, W. A. Green (Distribution Engineer, Paisley), Royal Technical College, Glasgow.

Jan. 19.—**Manchester and District Junior Association of Gas Engineers**: "The Calculation of Gas Flow Through Pipes and Orifices," J. G. Davey (Liverpool). Visit to the meter works of Sawer & Purves, Ltd.

Jan. 22.—**Yorkshire Junior Gas Association**: Discussion meeting, Wakefield.

Jan. 25.—**Southern Association of Gas Engineers and Managers (Eastern District)**: "Ten Years' Experience of a Two-part Tariff," J. E. Davis, F.R.I.C., Principal Technical Officer, and R. F. Layton, Tariff Officer, South Metropolitan Gas Company. Gas Industry House, 2.30 p.m.

Jan. 29.—**Western Junior Gas Association**: "Accountancy," G. Sherlock (Torquay), Bridgwater.

Miss Violet Carson, of "Have a Go" fame, opened a series of cookery demonstrations arranged by the Thornton Cleveleys U.D.C. Gas Department and Alfred Bird & Sons, Ltd., of Birmingham, and was so interested that she attended several subsequent afternoons as a member of the audience.

COMMERCIAL AND INDUSTRIAL UTILIZATION OF GAS: NO. 1

By F. DICKINSON, M.Inst.F.,
Industrial Gas Engineer, Newcastle and Gateshead Gas Company

The development of gas sales to commercial and industrial premises requires an entirely different approach from that of domestic gas sales, for the personnel should be conversant with the multiplicity of trade processes and engineering problems intimately connected with the relevant applications of fuel. A background of practical mechanical engineering experience should, therefore, be a *sine qua non* of men proposing to operate in this sphere of activity. Unfortunately, for various reasons, this is not always possible to achieve, so that it is essential to educate them in the shortest feasible time to the degree where they are capable of dealing intelligently with the technicalities that inevitably arise with each proposition.

This problem has become more pronounced with the break in the education of young men caused by the incidence of the military service period and the rehabilitation of ex-Service personnel in civil life, with their natural demand for work of an outside rather than a sedentary nature. In many cases the several excellent qualifications of an individual could be nullified for such specialist work by the almost complete absence of knowledge of mechanical engineering. There are, too, such other cases as members of office staff dealing with commercial and industrial matters but having no practical contacts with either the consumers or their process applications, the maintenance fitter who deals with the practical side, and the student requiring both academic and practical information.

With a view to giving the foregoing an indication of the scope of the utilization of gas in industry, and guidance in respect of some of the problems they are likely to meet, we intend to publish a series of twelve articles covering the fundamentals of this specialized field of fuel technology, which will incorporate a due proportion of both technical and practical information. It will be appreciated that limitations of space must perforce affect the extent of development of any particular subject, but it is hoped that the information in these articles will give readers a primary picture of representative applications sufficient to interest them to the point of developing the series into a useful reference book.

The main titles and sub-titles of the articles are as follows:—

No. 1. General Commercial and Industrial Applications.—(a) *Broad designation of spheres of application.* (b) *Commercial applications.* (c) *Industrial applications.* (d) *Relative fuel costs.* (e) *Method of dealing with individual projects.*

No. 2. Combustion.—(a) *Principles of combustion characteristics of various fuels, and flue gases.* (b) *Types of town gas burners, and air/gas mixing equipment.* (c) *Types of furnace, construction and temperature range.*

No. 3. Heat Transfer, Losses, and Recovery.—(a) *Conduction, convection, and radiation.* (b) *Heat losses from furnace wall.* (c) *Calculations for two average furnace applications.* (d) *Utilization of waste heat.*

No. 4. General Types of Process Applications.—(a) *General range of applications.* (b) *Approximate temperatures of heating operations.* (c) *Liquid heating applications.* (d) *Lead and lead alloys.* (e) *Gas engines.* (f) *Selection of appropriate furnaces.*

No. 5. Ferrous and Non-Ferrous Processes.—Ferrous (a) *Manufacture and characteristics of cast iron and steel.* (b) *Normal process and heat treatment.* Non-Ferrous (a) *Manufacture and characteristics of various hard and soft metals and alloys.* Protective Atmospheres (a) *Types of atmospheres.* (b) *Applications: Annealing, non-ferrous, ferrous; hardening, ferrous; Gas carburizing, brazing, sintering.* (c) *Protective coatings.*

No. 6. Drying and Similar Processes.—(a) *Core and mould drying.* (b) *Other general drying processes.* (c) *Paint and lacquer drying.* (d) *Melting and varnish, resin, &c.* (e) *Vitreous enamelling—smelting and application.* (f) *Ceramic processes and furnaces.*

No. 7 Glass.—(a) *Different types of glass.* (b) *Melting.* (c) *General processing; pot furnaces, tank furnaces. Primary operations—hand blowing, pressed ware, and fully automatic machines, sheet glass, rod and tubing, glass fibre, and optical glass. Secondary operations—glory holes, annealing, cracking-off and fusing, colour burning. The use of town gas.*

No. 8. Food Preparation.—(a) Bread, Cakes, and Confectionery: *The process of bread making. The evolution of large scale baking ovens. Applications of town gas in a bakery. Fuel costs. Cakes and confectionery. Other types of processed food.* (b) Canteen, Hotel, and Institution Kitchens.—*Kitchen design. Kitchen equipment. Preparation of food—requirements. Average gas consumptions*

No. 9. Hot Water and Steam.—(a) *Water.* (b) *Hot water applications, and units.* (c) *Hot water date.* (d) *Boiling water applications.* (e) *Steam.* (f) *Steam boilers.*

No. 10. Space Heating.—(a) *General remarks.* (b) *Calculations for heat losses.* (c) *Calculations for fuel consumptions.* (d) *Summary of applications.*

No. 11. Temperature Measurement, Control and Protective Equipment.—(a) *Pyrometry.* (b) *Controlling and/or recording instruments.* (c) *Safety devices.*

No. 12. General Summary.—(a) *Approach to consumer.* (b) *Preparation of propositions.* (c) *Development of loads.* (d) *Maintenance and development.*

As no individual person can possibly specialize in all the differing phases of industrial process applications, the author has had recourse to a number of specialist technical papers and other sources of detailed information to assist him in the compilation of these articles. He will make reference to these at the end of each relevant article, and takes this opportunity of expressing his acknowledgment and thanks to all concerned, with particular reference to the inspiration and excellence of the technical data issued by the American Gas Association, of which he is a Member. He also wishes to place on record the patience of Mr. J. M. A. Mitchell in editing the original drafts, and the kindness of Mr. E. Crowther, M.Eng., A.M.I.C.E., M.Inst.Gas E., General Manager and Chief Engineer of the Newcastle-upon-Tyne and Gateshead Gas Company, Chairman-designate of the Northern Area Gas Board, in granting permission for the publication of these articles.

GENERAL COMMERCIAL AND INDUSTRIAL APPLICATIONS

1. *Broad Designation of Spheres of Application.*

(a) *Domestic.*—Private houses and flats.

(b) *Commercial.*—Shops and warehouses; restaurants, public houses, cafés, eating houses, fish fryers, and bakers; hotels, boarding houses, clubs, lodging houses; hospitals, nursing homes; educational establishments; offices, banks; theatres, cinemas, places of amusement and recreation; churches, chapels, parish rooms; Government, public, and local authority buildings; railways, garages.

(c) *Industrial.*—Manufacturing establishments, factories, and workshops.

(d) *Public Lighting.*

(e) *Bulk Supply for Re-Sale.*

It will be appreciated from the above that gas used for lighting, space heating, hot water supplies, or canteen facilities in any type of establishment will fall into the appropriate category.

The above classification of gas consumers has been recommended by the Industrial Gas Development Committee for documentary and official usage. Of the total gas made in this country the proportions of sales are given by some authorities as domestic 60%, industrial 30%, commercial 10%. It is felt that the value of 30% for industrial gas sales is too high for the whole of the country, and the Political and Economic Planning Committee "Report on the Gas Industry in Great Britain" gives the proportions as domestic 60-70%, industrial 10-20%, commercial 10-20%, public lighting 5%. A fair average would probably be domestic 62%, industrial 23%, commercial 10%, public lighting 5%. Over a number of individual undertakings the ratio of domestic to the combined industrial/commercial sales can vary from 70-30% to 30-70% with an average of 60-40%. Where manufactured gas only is available any appreciable over-weighting of the industrial load from the above average may prove uneconomic and unstable, as such gas sales must be related to the sales of residual coke.

2. *Commercial Applications.*

The commercial field is one removed from that of the domestic, the prices charged for gas are usually within close range of the domestic charges, and the applications are numerous, so making

this type of business attractive. It is, in fact, the "bread and butter" business, combining the benefits of rapid consumption turnover and stability of production with a spreading of closing-down risks over such a wide diversity of firms and trades that the effects of slump conditions are minimized to an almost negligible degree. It is also enhanced by the incidence of the steady domestic demand for the types of products produced.

A comprehensive list of all the various applications for the trades under discussion would cover many pages, but fundamentally they can be considered to cover a range commencing with small space heating and hot water units and working up through central heating to process loads, particularly in the preparation of food and products for retail trade purposes, with some digressions into the small utility and luxury trades. For example, the retail food trades fulfil all the desirable requirements and can be generally listed as follows:

(1) Hotels, restaurants, cafés, buffets, snack-bars, &c.
(2) Canteens and similar uses.
(3) Fish and chip shops.
(4) Makers of cooked meats, and similar specialties.
(5) Sweet manufacturers.
(6) Small bakers and confectioners.
(7) Milk retailers—bottle cleaning, pasteurizing, &c.
(8) Makers of non-alcoholic drinks, &c.

Clear-cut divisions are difficult owing to overlapping and similarity of either applications or processes, but the above is an indication of one extensive trade. Experience in one section may prove valuable in another; the essential point is to concentrate on the individual requirements of a specific customer, and apply such experience in a particular and selective manner to produce the most satisfactory results. This assumes a pre-knowledge of appropriate applications, such as the following:—

Hot Water.—Wash-basins, baths, showers, large baths for sports pavilions, and swimming pools.

Boiling Water.—Open boilers for food processes, tea and coffee making—from small urns to instantaneous boiling water units.

Space Heating.—Gas fires and radiators, direct gas heaters of the wall, bowl, radiant, and unit air heater types. Central heating systems of various types.

Food Preparation.—Meat boiling, frying of fish and chips, making of pickles and sauces, &c. Making of sweets, chocolates, &c. Small scale confectionery, bread and cake making. Requirements of cafes, restaurants, canteens, clubs, boarding houses, hotels, and institutions.

Process Work.—Too many applications to detail, but most commercial establishments have processes requiring heat, from tailors' shops to laboratories and institutions.

3. *Industrial Applications.*

The field for industrial gas utilization is one of larger dimensions, with greater production and gas usage. The diversity is perhaps wider than in the commercial field, as it also includes the processing or using of liquids, gases, and metals; but there are many points of similarity. For example, hot water is extended to process requirements, steam to boilers of greater evaporation per hour at higher pressures, the range of space heating is much the same but bears reference to factory workshops and offices, while food preparation is in terms of bulk production of such items as the following: Manufacture of potato crisps and cereals; steaming of food under pressure; roasting of coffee, malt, and meats; baking of biscuits, ice-cream cones, rolls, pies, &c.; baking of bread, cakes and confectionery; manufacture of chocolate and sweets.

The main applications, however, are in the definite sphere of engineering, and, briefly, cover the casting, processing, and heat treatment of ferrous and non-ferrous metals, the melting and manipulation of glass, protective coatings for finished articles, the drying and firing of ceramic articles, drying of powders, and the incidental heat demands of manufacturing processes or fabrication work such as obtains in constructional steel works or shipbuilding yards.

4. *Relative Fuel Costs.*

It is of vital importance to know both the actual costs of competitive fuels, and their relation to the equivalent cost of gas for similar applications and bulk consumption. This involves a knowledge of the relative efficiencies of application, and other incidental advantages which may not easily be evaluated in terms of money but may have a definite bearing on the decision to use gas. For example, it has been proved in practice that conversion from coal-firing to gas-firing with fully automatic controls can reduce the quantity of gross therms of heat put into a furnace to produce a known weight of heated stock in a known time at a similar temperature in the ratio of 1.0 gross therm of gas to replace 3.25-3.75 gross therms of coal. There are then the saving in labour costs and the reduction in the percentage of reject articles, quite apart from saving in handling and floor space, cleanliness, and the ability to reproduce at will the proved conditions for high efficiency production.

The straight cost figures are, therefore, not the entire answer, and must be used with a sense of proportion and discretion. For example, one therm (100,000 B.Th.U.) is apparently equal to 29 units of electricity (3,412 B.Th.U./unit), but if a particular gas application should be 50% efficient, and the electric application 95% efficient, then the price of gas must be below 7.5d. per therm to complete with electricity at 0.5d. per unit, all other things being equal. Actually, when all overhead charges for electricity are included, the net cost per unit for industrial purposes will rarely be below 0.75d. per unit, and mostly above 1.0d. per unit. Also the efficiencies of industrial heat applications can vary between 15% and 65% dependent on the temperatures and the heat losses involved.

Industrial fuel oils contain about 1.7 gross therms per English gallon, and the heavy grades available for furnace work now cost about 7.5d. per gall. (including 1d. gall. tax). The latter is being remitted for large boiler fuel, but, as the cost of heating the oil represents approximately 0.75d. per gall., the final cost is of the order of 7.25d. per gall. This would appear to require gas at not more than 4.25d. per therm, but, as most fuel oils have to be burned with about 100% excess air to prevent the formation of smoke and carbon, a more representative competitive gas price is 5.25d. per therm—*i.e.*, for like conditions 1.25 therms of gas can do the same work as one gallon of oil, and in a few particular instances of continuous operation this has been reduced to one therm of gas per gallon of oil.

5. *Method of Dealing with Individual Projects.*

A prime function of the sale of gas for commercial and industrial purposes is a background of technical theoretical knowledge and practical mechanical engineering and metallurgical experience, supported by a sense of proportion of fuel and other economic factors. This is of vital importance, as a practical customer reacts favourably when discussing technical and fuel problems with an engineer who is fully conversant with such. The same applies to the discussion of capital and working costs. The psychological sequence of events should be as follows:—

1. Creation of interest of customer.
2. Discussion of technical problems, with appropriate recommendations.
3. Discussion of economic factors.
4. Approximation of capital cost involved.
5. Confirmation of considered schemes.
6. Prompt follow-up of item No. 5 for final clarification of all relevant points, to enable a complete proposition to be presented to the customer's directors for approval.

It is essential to remember that executive officials have considerable responsibilities, and the objective should be to portray to them the broad picture of a scheme, leaving a discussion with a view to preparing a detailed scheme for submission to them. This saves them both time and worry, and is half-way to acceptance of the project, as they have only to adapt it to the form of presentation most suited to their managerial requirements before stating their own case for approval. The work done on their behalf is rarely wasted effort, and is generally much appreciated.

It should be the aim of every representative to know the potential gas requirements of all the various factories and industries in his area of activity, and to be able to ascertain at a glance upon walking through a factory whether this is being achieved. A typical example is a medium-sized general engineering shop where the following items would probably be found:—

1. Office heating and hot water service.
2. Works heating.
3. Canteen.
4. Foundry (cast iron)—core and mould drying, ladle heating.
5. Foundry (brass, &c.)—core drying, 4-8 type crucible furnace.
6. Tool room—heat treatment and tool-hardening furnaces, coppersmith's blowlamp.
7. Smiths' shop—forging furnaces.
8. Maintenance department—tool-hardening, rivet heating, and commutator drying furnaces. Portable burner for odd jobs.
9. Where cast steel work is done there may be several large bogie-type annealing furnaces.

Some of the above items are common to most factories, with differing applications for process heating. The crux is: First, to know what to look for, and secondly, to make a specific point of looking for it.

Stockport Corporation's Proposal to build a new gas-works at Poynton (Cheshire) was discussed at a meeting of Poynton-with-Worth Parish Council. Mr. J. Shrigley stated that a letter had been sent to the Rural District Council by the Stockport Corporation outlining a scheme to erect gas-making plant near Hazelbadge Road. Nearby residents had urged him to have this "menace to their health" withdrawn. Mr. Shrigley said that the Council agreed the land could be used for industrial purposes but this would be a huge business, injurious to the amenities of the district. The Council had been under the impression that the land would be used for light building and had no idea it was for gas-making. It was decided to hold a special meeting to discuss the matter.

EAST WIGHT GAS COMPANY'S NEW PRESSURE HOLDER INSTALLATION

By A. H. O. JOHNSON, B.Sc., A.R.I.C., A.M.I.Chem. E.*

THE East Wight Gas Company has a system of high-pressure mains as shown in Fig. 1. This system has been built up as a result of the increasing load and the integration of the gas undertakings of the south-eastern portion of the Isle of Wight. Originally, gas was made both at Ventnor and at Sandown but now the production facilities

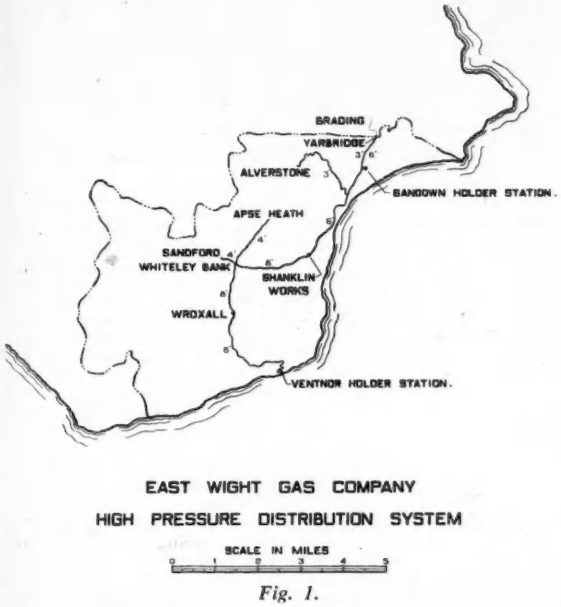


Fig. 1.

are concentrated at the Shanklin Works and the gas is distributed largely through the system of high-pressure mains. Over two-thirds of the gas sold by the East Wight Gas Company is distributed from the Shanklin Works through the high pressure main system and indeed many of the consumers take their gas through service governors direct from the high pressure mains.

By 1945 it had become clear that some additional provision was required to cope with the demand for gas at the peak periods. The daily peak periods in this area occur between 7 a.m. and 9.30 a.m., 10.45 a.m. and 1.15 p.m., 6 p.m. and 8 p.m., and owing to the holiday season the peak occurs during June, July, August, and September. The high pressure mains were being fed with gas from steam-driven Bellis & Morcom compressors of 48,000 and 25,000 cu. ft. per hour capacity at 15 lb. per sq. in. gauge. The problem, briefly, was to supply peak load requirements for Sandown, Shanklin, Wroxall, and Ventnor areas. The available means were the compressors at Shanklin works and the system of high-pressure mains. Shanklin itself was largely supplied from a low pressure system. The high pressure mains on the Sandown side are about 5½ miles long and those on the Ventnor side are about 7¼ miles long. The mains on the Ventnor side also supply several villages, the latter being the more difficult in which to maintain a peak load supply.

The best solution of the problem was found to be the incorporation of a pressure holder installation into the existing high-pressure system. At the same time a larger high pressure main was to be provided between the gas-works at Shanklin and Wroxall (8 in. replacing 4 in.).

The size of the installation was based on an analysis of the peak load and its incidence, so that the vessel had a capacity roughly equal to the peak load requirements in the Wroxall and Ventnor area. The daily peak load to be handled, which could not be satisfactorily dealt with by the existing compressors at Shanklin, amounted to 150,000 cu. ft. and this was spread over the seven hours of peak demand. During the remaining 17 hours varying quantities in excess of the make were available for storage purposes. After consideration of the surplus gas available at various times of the day the compressor size chosen was 15,000 cu. ft. per hour. The working pressure chosen was 50 lb. per sq. in. gauge, well within the capacity of a single stage reciprocating compressor. These problems were settled without much difficulty, but the remaining problem, that of the site for the holder and for the compressors, was not so easily solved because of the many factors that had to be taken into account.

There were three sites on which the holder could conveniently be erected, (1) at Old Chalkpit, Upper Ventnor, (2) at the rear of the Wroxall Showroom, or (3) at Shanklin Works. The advantages and disadvantages of each of the three sites are set out below.

Site 1—Upper Ventnor.

Advantages (i) Nearest to the point of maximum demand.
(ii) Maximum potential hourly delivery from the holder.
(iii) Practically all the gas stored would be releasable.
(iv) The holder would be concealed by surrounding landscape and would not spoil local amenities.

Disadvantages (i) The cost of the site and its relative inaccessibility.
(ii) Necessity of scheduling site for the storage of gas.
(iii) Long connecting inlet and outlet mains (each about 350 yds.).
(iv) Adequate supervision of station would be difficult and costly.
(v) Maximum pumping costs at Shanklin.

Site 2—Wroxall.

Advantages (i) Nearer than site 3 to maximum demand.
(ii) Greater potential hourly delivery than from site 3.
(iii) Part of proposed site already owned by Company.
(iv) Pumping costs at Shanklin would be lower than site 1.
(v) Comparatively low pressures would be possible on Shanklin-Wroxall main during off-peak loads.
(vi) Supervision simpler than at site 1 as there is a resident fitter at Wroxall.
(vii) Short connecting mains as compared with site 1.

Disadvantages (i) Cost of additional land required.
(ii) Necessity to schedule site for storage of gas, with possible objections from local inhabitants.

Site 3—Shanklin Gas-Works.

Advantages (i) The site was already available and the property of the Gas Company.
(ii) The site was already scheduled for gas-works purposes.
(iii) Supervision possible at all times in ordinary course of power house man's duties.
(iv) Holder stock could be adjusted, within limits, to accord with conditions on the works.
(v) The holder could be used alternatively to supply the Sandown area.
(vi) Could be hand operated if necessary, thus reducing initial cost.
(vii) Compression costs would be less than for sites 1 and 2.

Disadvantages (i) Holder at maximum distance from points of maximum demand with a consequent lower availability of gas.

It is not possible to discuss all the financial pros and cons of the various proposals. However, after discussions with the Ministry of Fuel and Power, it was decided that the vessel and compressors should be installed at Shanklin Gas-Works. Anticipating events it may be mentioned that within a few days of setting the installation to work it was found expedient to use the contents of the holder on the Sandown area thus justifying advantage (v) sited under Site 3.

Responsibility was placed with one main contractor, Whessoe, Ltd., of Darlington, the builders of the pressure holder, for the whole of the work involved in the construction of the holder itself, its foundations, the compressing and governing gear, the necessary building and other ancillary work.

The Holder

The maximum pressure required in the high pressure main system is 10 lb. per sq. in. gauge, and the capacity of the vessel 150,000 cu.ft. of free gas from the working pressure of 50 lb. per sq. in. gauge down to 10 lb. per sq. in. The methods of design used for the pressure holder are set out in Communica-

* Whessoe, Ltd., Darlington.

tion No. 314 of the Institution of Gas Engineers, "The High Pressure Gasholder," by Noone and Grant, 1947.

To meet the above requirement a vessel with a normal capacity of 55,000 cu.ft. was necessary. The capacity was obtained by making a vessel 30 ft. in diameter and 88 ft. 2½ in. long with hemispherical ends. The plate thickness (including an allowance for corrosion of $\frac{1}{16}$ in.) in the cylindrical barrel is 1¼ in. and the plates forming the hemispherical ends are $\frac{3}{32}$ in. These figures are for a design pressure of 55 lb. per sq. in. gauge and are calculated according to the Associated (Insurance) Offices Technical Committee code for Fusion Welded Steel Pressure Vessels, Class II, but without heat treatment or X-ray examination of the welds. The thickness of 1¼ in. for the barrel plates is about the optimum for this type of installation. The cylindrical part of the vessel contains nine strakes and each strake has five plates except where plates have fittings in which case six plates are required in the strake. The hemispherical ends each consist of a 9 ft. diameter end plate and 15 segmental plates. The fittings comprise four manholds, two on top on the vessel and two within easy access from the ground, one 6 in. spring-loaded relief valve, two 2 in. drain valves, one 4 in. inlet valve and one 6 in. outlet valve. The valves, of the parallel slide type, are suitable for a pressure of 100 lb. per sq. in. gauge. In addition a 6 in. Bourdon

Fig. 2.—Foundation plinth, showing ball race.

pressure gauge and a thermometer are provided. An internal ladder extends from each of the top manholes to the bottom of the vessel and the external fixed ladder provides access to the relief valve.

The foundations for the vessel consist of five concrete plinths and were so designed as to be capable of taking the load imposed during the hydraulic testing of the vessel. Between the concrete plinths and the vessel is a ball support system which is the subject of a patent application by the holder makers. This design of support facilitates the turning of the vessel during fabrication enabling the welding to be carried out downhand, that is, in the most advantageous manner. This ball support is a permanent feature of the installation and it is therefore possible to revolve the holder for inspection purposes after removing the gas connexions. At the points of support on the foundation plinths the vessel is strengthened by internal ring girders. Provision for longitudinal expansion and contraction is made in the ball support frameworks.

Figs. 2, 3 and 4 show the vessel at different periods during construction and the ball supports can be clearly seen in Fig. 2. Although not called for in the design code the major welds in the vessel were examined by means of the maker's transportable X-ray equipment to ensure that the quality of the welding was being maintained. A further refinement not called for in the design code consisted in the heat treatment for stress relief of the plates to which the fittings had been attached.

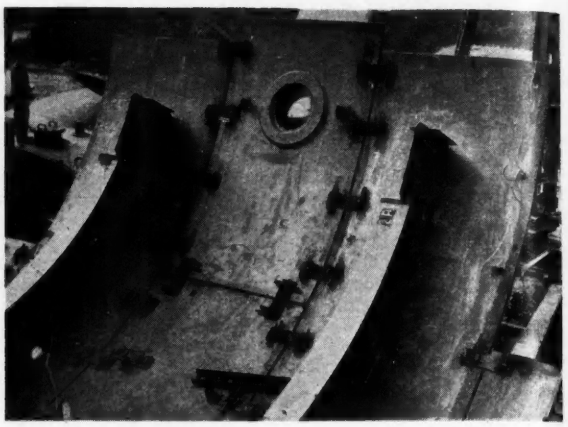


Fig. 3.—Plates keyed ready for welding during the construction of the holder. The view also shows part of the internal girders.

The weight of steel in the vessel is about 215 tons and the water weight during the hydraulic test was about 1,535 tons; thus the total load during the test amounted to 1,750 tons. A part of this load was borne by temporary supports attached to the hemispherical ends of the vessel by means of the cleats which may be seen in Fig. 5. Since this vessel was designed, development work has led to the abolition of these temporary supports in future vessels by increased strengthening of the hemispherical ends.

Proving of the vessel with water to the test pressure of 96 lb. per sq.in. gauge took place in the presence of the Boiler Insurance Company's Inspector and was without incident. No difficulty was experienced either on account of the water load or on account of leaking, there being no seams, joints or leaks to make good.

The Compressors

As shown earlier in this article the daily peak load is met by filling the holder each night and the period available for pumping is approximately from 8 p.m. to 7 a.m. and the 15,000 cu.ft. per hour compressors are capable of filling the holder in 10 hours. Two such compressing sets are provided, one to act as standby, and each set is driven by a 45 H.P. induction type electric motor running off the available 400 volts, three-phase, 50-cycle supply. The motors are housed in a separate part of the building and the shafts pass through gas-tight wall boxes so that no hazards resulting from motor sparks exist. In Fig. 6 the rectifier equipment and switchgear seen in the background are not a part of the compressing equipment. On the left hand side of the picture one of the starter panels can be seen. The compressors and governors are illustrated in Fig. 7. The compressors are of the Bryan Donkin vertical, single crank, single stage, double acting, reciprocating type and have forced feed lubrication. The gas cylinder bore is 12 in. and the stroke is 6 in., and the nominal speed of the compressors is 540 E.P.M. The cylinders are water-cooled and the four tanks in the water circulating system can be seen, just outside the compressor house, in Fig. 5. An immersion heater with thermostat is provided to ensure that the circulating water does not freeze while the compressors are idle, and water flow indicators

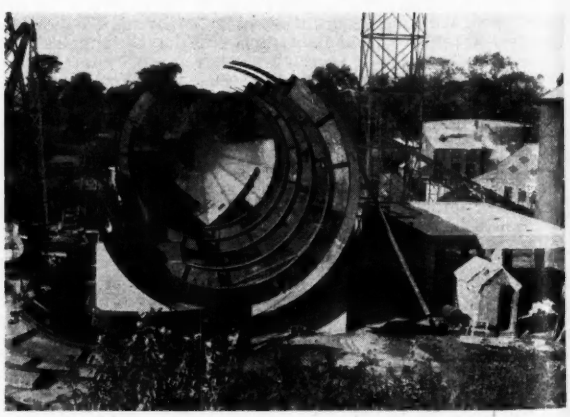


Fig. 4.—Partly fabricated vessel.

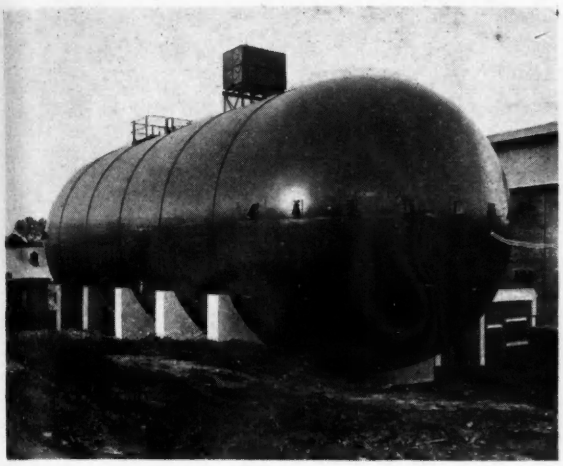


Fig. 5.—View of the holder showing hemispherical end construction.

are fitted, one of which can be seen in Fig. 7, close to the left hand side of the cylinder head.

Automatic controls are provided to cut in the compressors at a predetermined low pressure in the holder and also to cut out the compressor when the pressure reaches 50 lb. per sq. in. gauge. These consist of Bourdon gauges fitted with electrical contacts. These are in series with a relay which cuts out the compressor if the cooling water exceeds a certain temperature due to failure of the cooling water supply. Thus the compressor runs when required by the condition of the holder and is at the same time safeguarded against overheating due to failure of the water supply.

The Governors

The gas from the holder is fed to the district mains through one of two Reynolds 6 in. district governors. These two governors with the stem of a by-pass valve between can be seen in the background of Fig. 7. These governors are operated manually to suit the requirement of the district, maintaining any chosen pressure between three and 20 lb. per sq. in.

Although the holder installation was not put into commission until the end of July, 1948, sufficient experience has been obtained of the advantage of the new scheme in meeting peak loads, and considerable improvements both on the works and district have accrued. More uniform working of the manufacturing plant has been possible and pressures in the areas supplied have been maintained without difficulty.

The main contractors for this installation were Whessoe, Ltd., Darlington. The compressors, governors, and control equipment were supplied by the Bryan Donkin Company, Chesterfield. The slipring induction motors were supplied by Metropolitan-Vickers, Ltd., Brookhirst Switchgear, Ltd., Bristol's Instrument Co., Ltd., and Drayton Instrument Co., Ltd., supplied the control equipment. The concrete foundations and the compressor house were built by the F.C. Construction Co., Ltd. Insurance was effected by the Ocean Accident and Guarantee Corporation, Ltd.

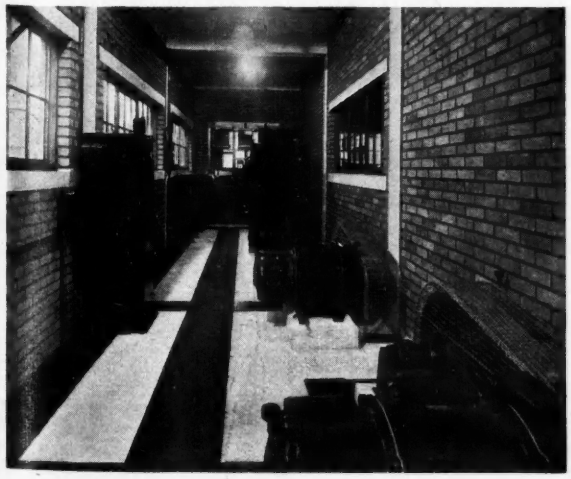


Fig. 6.—Compressor house—motor room portion.

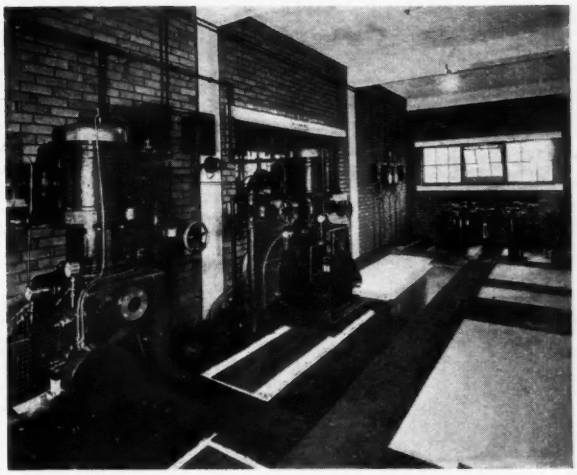


Fig. 7.—Compressors and governors.

This work was undertaken on the instructions of Mr. L. G. Payne, Engineer and Manager of the East Wight and Ryde Gas Companies. Mr. Payne was responsible for this scheme from its initial stages to its completion and commissioning. Thanks are expressed to him and his staff and the Directors of the East Wight Gas Company for the facilities given and for permission to publish this description.

CALOR GAS HOLDING COMPANY

Application has been made by the Calor Gas Holding Company, Ltd., to the Council of the London Stock Exchange for permission to deal and for quotation for the whole of the issued share capital of the Company. Incorporated as a private company on Nov. 2, 1948, and converted into a public company on Dec. 21, the Company has an issued share capital of £293,524 in 1,174,096 shares of 5s. each. The whole of the issued share capital of the operating company —Calor Gas (Distributing) Company, Ltd., has been acquired.

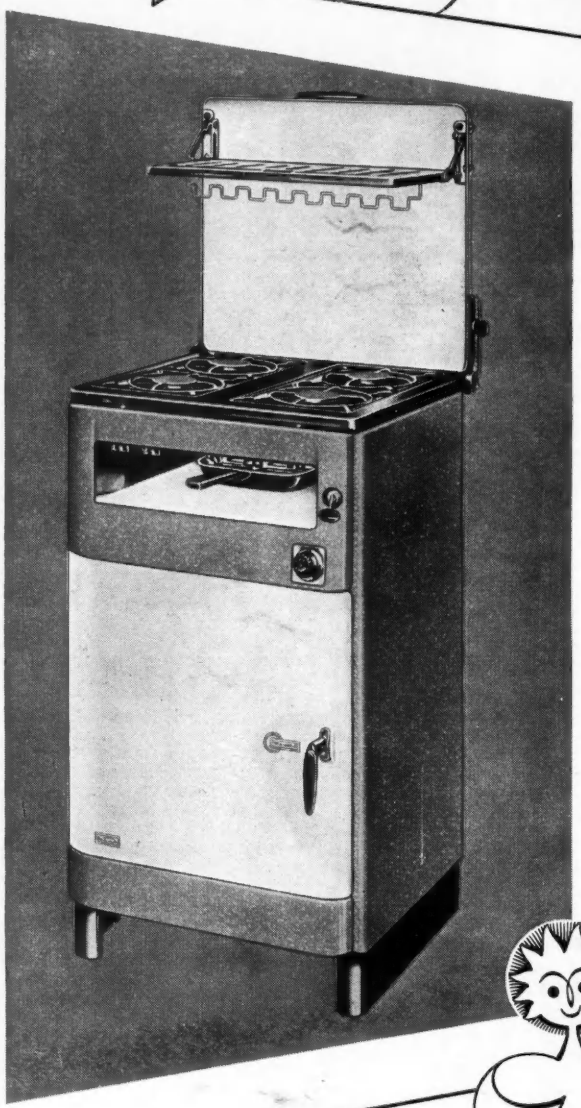
The operating company was incorporated as a limited company on Aug. 2, 1935, under the Companies Act, 1929, and since that date has carried on business as distributors of " Calor " gas and appliances used in connexion therewith. " Calor " gas is a liquefied petroleum gas which can be used for all domestic and other purposes for which coal gas might be used if it were available, and is so used in areas which are not served by ordinary gas mains. The operating company owns the Trade Mark " Calor " in respect of liquefied fuel gas, and in respect of cookers, hot-plates, fires, boiling rings, geysers, wash boilers, gas heated flat irons, lighting brackets, lighting pendants, gas burners, bunsen burners, gas pressure regulators, and gas valves.

" Calor " gas is supplied to consumers in light-weight steel cylinders, through the media of more than 700 appointed dealers throughout England and Wales, and by concessionnaires in Scotland, Northern Ireland, and Eire. " Calor " gas is obtained from leading oil refiners on short-term arrangements. This has been the practice since 1940. The Directors anticipate that adequate supplies of " Calor " gas, cylinders, and appliances will be available for the requirements of the operating company.

The estimated profits of the operating company earned in the period Aug. 1 to Nov. 30, 1948, are in excess of those earned for the corresponding period in 1947. The Directors are of opinion that, in the absence of unforeseen circumstances, the profits of the operating company for the year ending July 31, 1949, after charging Directors' remuneration at the rates now applicable, will not be less than those earned in the year ended July 31, 1948. In such case it is the intention of the Directors of the operating company to recommend for payment such final dividends as will enable the holding company to pay a dividend of not less than 16% actual for the period of approximately 7½ months ending July 3, 1949 (that is at the rate of approximately 25% for a full year).

Aspatria Parish Council (Cumberland), which complained about local gas supplies, has been told by the Ministry of Fuel and Power that demand locally had doubled since 1938. There was enough plant to deal with the increase, but the distribution system was inadequate. Following representations by the Ministry improvement to the system were to be carried out.

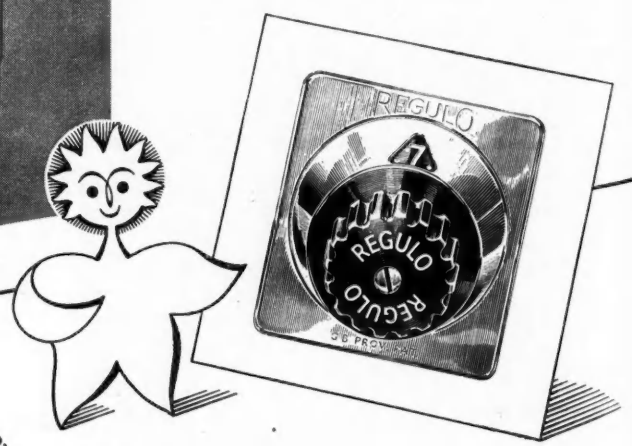
NEW WORLD



NEW WORLD *number*

1640

Here are two of the latest models of the NEW WORLD Gas Cookers—the No. 1640 and the No. 1840. They include all the advantages already so well-known to more than two million satisfied users of NEW WORLD Cookers, and many new developments resulting from Radiation research.



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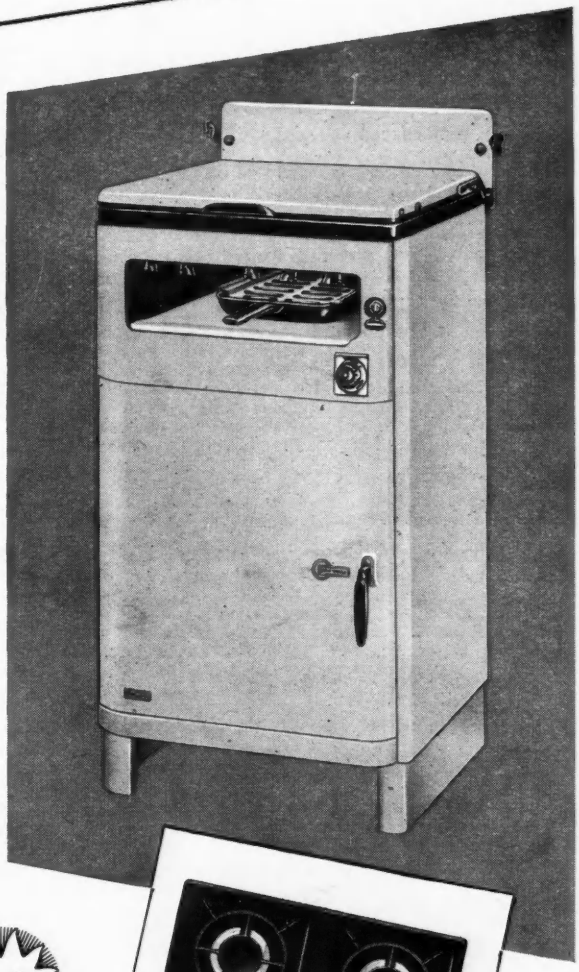

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NEW PURIFIER PLANT AT HIGGINSHAW

ON Dec. 16, 1948, there was an inauguration of a 5 mill. cu.ft. per day gas purifier installation. About 200 representatives of gas undertakings of Lancashire, Cheshire, and Yorkshire assembled at the Oldham Town Hall, and were officially welcomed by the Mayor of Oldham, Councillor Stott Thornton, J.P.

The party then proceeded to the Higginshaw Gas-works of the Corporation, where the Mayor invited Mr. R. Kelf Cohen, M.A., Permanent Under Secretary, Ministry of Fuel and Power (Gas Division), formally to sever the cord stretched in front of the entrance to the purifier plant. The new plant was then declared to be officially open for inspection. The party also inspected the works as a whole, which is, on the advice of the late Mr. F. Greenhalgh, as Engineer and Manager of the Oldham Corporation Gas Undertaking, eventually to supply gas for the whole of the county borough as a centralized unit.

A return journey was then made to the Union Club, Oldham, where luncheon was provided.

At the commencement of the proceedings all rose in silent tribute to the memory of the late Mr. Frank Greenhalgh.

A Noteworthy Achievement

Sir **E. W. Smith**, C.B.E., in proposing the toast of "The County Borough of Oldham," said that for many years he had enjoyed the personal friendship of the late Mr. Greenhalgh, who had died suddenly on Dec. 2. Mr. Greenhalgh was a gentleman whom he had always regarded with the greatest possible respect as a conscientious, honest gas engineer who stuck to his job, who understood it thoroughly. This was something for which the Oldham Corporation had every reason to be gratified and proud. He had been associated with Mr. Greenhalgh as a Director of a Company which assisted him in his re-organization plan, and they now witnessed a praiseworthy achievement. He was informed that the gas undertaking was acquired by the Corporation in 1853, and that in 1949 the local authority was to celebrate the 100th anniversary of its foundation as a county borough. He congratulated the Gas-works Committee on having produced such an appropriate brochure describing the new purifier plant. The opening paragraph was well worthy of notice: "With the passing of the Gas Act, 1948, the responsibility for this undertaking will come under the control of the appropriate Area Board, and while one hesitates to comment on the future, one may examine the past with satisfaction, and the Corporation can be proud of the fact that it is handing over a progressive, expanding, and financially sound undertaking." There was every reason for the County Borough of Oldham to be proud of its gas undertaking.

The **Mayor of Oldham** (Councillor Stott Thornton, J.P.), responding to the toast, said he appreciated the kind remarks made by the proposer in respect to such a distinguished servant of the municipality as Mr. Frank Greenhalgh. In one sense the present occasion was a sad one, but it was also one for rejoicing, because in the Higginshaw Works they had a permanent memorial to his memory. Mr. Greenhalgh had been a personal friend of his from boyhood, and even in those early days he had always studied how to work for the betterment of others. After years of hard work he entered the gas industry as a junior member of the service, ultimately rising to the responsible position of Engineer and General Manager. The town possessed one of the finest works in the country.

In the Mayor's Parlour after the inaugural ceremony. Seated (left to right): The Chairman (Alderman A. Marshall, J.P.); the Mayor (Councillor Stott Thornton, J.P.), and Mr. R. Kelf-Cohen, M.A. Standing: Mr. C. L. Hale, M.P., Mr. C. H. Leach, the Deputy-Chairman (Alderman F. Lloyd), Mr. J. P. McCrae (Ministry of Fuel and Power), Mr. S. Langford (Robert Dempster & Sons, Ltd.), Mr. E. Haines, LL.M. (Town Clerk), the Rev. C. H. Cadman, LL.B., O.C.F. (Mayor's Chaplain), Mr. B. C. Morton (Managing Director, Robert Dempster & Sons, Ltd.), and Mr. F. Cartledge (Deputy Engineer and General Manager).

Mr. **C. L. Hale**, M.P., proposed the toast of "The Gas Industry." Oldham, he said, had a long association with the production of gas. In the 1820's Oldham commenced with its Gas, Light, and Wood Company. The present works constituted a model of cleanliness and freedom from noise. It would be an integral part of an Area system to be brought into operation. Gas contributed largely to the amenities of both industrial and social purposes, and it was beyond question that in the future many people would visit the Higginshaw Works and note the progress which had been made by the Oldham Gas Department.

The new purification plant at the Higginshaw Works of the Oldham Gas Department. The purifiers are by Robert Dempster and Sons, Ltd., of Elland.

Mr. **J. MacLusky** (President of the Manchester District Association of Gas Engineers), in responding, said how much he admired the new purifying plant and the Higginshaw Works generally. The design was excellent. Perhaps it might not be known to some of those present who were not gas engineers what an important part a purification plant served. By its operation sulphur was removed from gas, so that hundreds of tons per annum were prevented from escaping into the atmosphere as they would do if coal was burned merely as raw coal. Gas consumption also assisted materially in the preservation of buildings. The industry generally was deeply indebted to such contracting firms as R. Dempster & Sons, Ltd., W. C. Holmes & Co., Ltd., the Woodall-Duckham Company, Ltd., West Gas Improvement Co., Ltd., Drakes, Ltd., W. J. Jenkins & Co., Ltd., and many others who built the plants. For many years it had been realized that the integration and grouping of gas undertakings was inevitable. This had been happening prior to the advent of nationalization not merely in the south of England but also in Lancashire and Yorkshire. It was realized that under the new Area Boards there would be centralization of administration, and of engineering ability, though it was hoped that management would be carried out on a local level. It would be desirable, for instance, that the gas consumers of Oldham should be able to go to the local gas office, interview the local gas manager and his staff, and feel that they were receiving service from the town in which they dwelt. He believed that the form of nationalization proposed under the Gas Act, 1948, and the organization to be set up under it, were the best course to take.

The Guests

Alderman **A. Marshall,** J.P. (Chairman of the Oldham Corporation Gas-works Committee), proposed the toast of " Our Guests," mentioning, among others, Mr. C. L. Hale, M.P. for Oldham, the members of the Town Council, the Chairman, Town Clerk and Surveyor, and other chief officials of Oldham, Mr. R. Kelf-Cohen, Permanent Under-Secretary to the Ministry of Fuel and Power (Gas Division), and his colleague, Mr. J. P. McCrae, Mr. W. Barclay and Mr. B. F. Browne, O.B.E., Regional Gas Officers, Dr. A. Badger, of the Federation of Gas Employers, and Sir E. W. Smith.

Much thought, he continued, had been given to the design of the purifier plant with a view to alleviating the arduous duties of oxide handling. Difficulties had had to be overcome with respect to the supply of the necessary materials for its construction, and particular consideration had to be given to the labour problem, but, owing to Mr. Greenhalgh's resource, the plant had been brought to completion. In conclusion, he referred to the death of Mr. Greenhalgh. As the Chairman of the Gas-works Commitee he (the speaker) had had much contact with him in regard to departmental matters in carrying out the policy of the Town Council. He respected Mr. Greenhalgh for his high integrity, and the Corporation had lost a great and a good servant.

Mr. **R. Kelf-Cohen,** M.A. (Permanent Under Secretary, Ministry of Fuel and Power (Gas Division)), responded to the toast. He said that all those who had any connexion with the gas industry would realize that the Higginshaw Works were a great memorial to the late Mr. Greenhalgh. Three or four years ago, said Mr. Kelf-Cohen, the Ministry of Fuel and Power placed upon him the responsibility, among other things, of being concerned with the gas industry. He recalled that in now far-off days, in the depths of the war in December, 1942, there was a proposal from the Oldham Corporation to extend the Higginshaw Gas-works. As his friend, Sir E. W. Smith, who was his colleague at the time, knew very well, it was difficult to approve proposals for extending works then when everyone was going all out on the war effort. It had to be made clear that any such proposal was definitely necessary in order to promote the war effort. However, a deputation came along to the Ministry accompanied by Mr. Frank Greenhalgh, who received the necessary authority to go forward with the extensions. As a result, they were assembled together and had witnessed the achievement of the object he had at heart.

Mr. **C. H. Leach,** M.A., A.C.A. (General Manager of the Liverpool Gas Company), also responded to the toast. He was convinced they had all learned something important by their inspection of the new purifiier plant.

The Contractors

Alderman **F. Lloyd** (Deputy Chairman of the Oldham Gas-works Committee) then proposed the toast of " The Contractors." The whole of the ferro-concrete work, with the exception of the siding, for the new purifier, had been done by the Russell Building and Contracting Co., Ltd. It was the first time the firm had carried out any work for the Oldham Gas Department. Personally, he felt certain, and he had been assured also by their late Engineer and General Manager, that it was a good job, and thoroughly in keeping with the rest of the plant at the Higginshaw Works. The purifying plant itself was installed by Robert Dempster & Sons, Ltd., a firm very well known in the gas industry, who had carried out much other work for the Oldham Corporation. In 1913 they built a 5 mill. cu.ft. spiral holder at the Hollinwood Works with perfect satisfaction to the Corporation. He was convinced that the new purifier plant would equally well withstand the test of time. That opinion was shared by many gas engineers who had inspected it during its construction and upon its completion. His great regret was that their late Engineer and General Manager did not live to witness the successful culmination of his effort.

Mr. **B. C. Morton** (Managing Director of Messrs. R. Dempster & Sons, Ltd., Elland), in expressing his acknowledgment of the toast, thought that when Yorkshiremen were entrusted to do work for Lancashire men the Battle of the Roses must now be considered over. The firm with which he was associated had existed for 100 years in Yorkshire, and they felt themselves to be especially honoured to be the contractors for the new purification plant. The day's proceedings placed another milestone on the pathway of the industry. The Borough of Oldham had fully lived up to the significance of their motto *sapere aude* and had dared to be wise. Their foresight in establishing the new plant established the fact that they had been amply preparing for new commitments. The identity of the industry would change, but its importance in the economic life of the community would increase. With change of ownership the gas industry would lose a large number of devoted public men who had served the country well in the past. Not the least among them would be Alderman J. Marshall, now Deputy Mayor of the Borough, and Mayor-elect for the centenary year.

Mr. **T. M. Russell** (Director, the Russell Building and Contracting Co., Ltd.) also responded to the toast. He wished to express the appreciation of his Company of the assistance they had received from the late Mr. F. Greenhalgh and Mr. F. Cartledge, the Deputy Engineer, and also from Mr. Walsh, the Resident Engineer, without whose diligent attention to details the work might not have been as good as the firm would like to think it was.

The New Plant

The new plant consists of five cast iron purifiers 40 ft. by 50 ft. by 6 ft. 6 in. deep arranged in one line, with an oxide volume in each box of about 8,000 cu.ft. The rated capacity is 5 mill. cu.ft. of gas per day. The whole plant is prepared for the addition of a duplicate parallel line of five purifiers to work on a parallel gas stream. A reinforced concrete building encloses the plant, oxide dumping pits at each end, and the revivifying floor between. Oxide is handled by a 6½ ton overhead grabbing crane which also lifts the purifier covers. A rail siding extends the full length of the plant outside the house to receive spent oxide, and another enters the house transversely to deliver new oxide into the deep dumping pit.

For supporting the pier walls of the house and the floors of the oxide pits, 128 medium Franki piles approximately 18 in. diameter were driven to lengths varying from 28 to 38 ft, with a set of 1 in. in each, to support safely a load of 65 tons. Elsewhere, for the revivifying floor and substructure, 56 standard (heavy) Franki piles approximately 22 in. diameter were driven to lengths varying from 32 to 41 ft., with a set of ¾ in. each, to support safely a load of 90 tons.

The house, which is 266 ft. long by 63 ft. wide by 48 ft. 6 in. high to the eaves, has a reinforced concrete skeleton with Accrington brick panelling, steel roof principals with corrugated asbestos sheet covering and a central jack roof of generous proportions. The reinforced concrete outlines, with the chequered brick panelling, the eaves, parapets, the distinctive roofing, and windows at regular intervals along the side walls at high level, produce in their essential combination, a structure of pleasing and sturdy design. Within the house at ground floor, there is a spacious revivifying floor with clear headroom of 14 ft. for mechanical shovels, and oxide dumping pits at both ends. A deep 22 ft. pit at the siding end is designed to receive new oxide from rail trucks alongside or reclaimed oxide from the revivifying floor; and a shallow pit 10 ft. deep to receive revivified oxide from the nearby floor or new oxide from road wagons entering the works.

The purifier casings are of cast iron throughout. Internal side plate stiffeners of the usual form have been omitted to leave the oxide space as unrestricted as possible, and the strength to resist the test pressure of 60 in. W.G. is obtained solely by external bowed ribbing. The six welded covers for each purifier are secured with swing type bolts and fitted with " Foliac " sealer jointing. Concrete is laid over the tops of the upturned flanges of the bottom plates to conduct condensate to the drainage ports and to assist in conserving heat within the boxes.

The purifiers are controlled by 15 cast iron hydraulic valves with 40 in. seal, which permit any one or more the five boxes to be operated in series in either backward or forward rotation, and downward through the oxide layers. It has been found that rotations can be changed in 14 min.

The main heater is situated in the approaching gas inlet main, immediately before the inlet to the first box. It embodies a readily removable element of Meehanite gilled iron tubes. Humidifiers are fitted at the inlet of each purifier, and supplied complete with a full range of orifices to enable the quantity of steam injected to be controlled.

Duplicate Bryan-Donkin electrically-driven multi-blade air blowers with " V " rope drives are mounted at valve platform level near the end of the No. 5 purifier, under a steel housing. Each blower is capable of delivering up to 5% of the maximum rated gas flow. By means of an ingenious governing device connected to orifice plates in the gas and air streams, the gas and air flows are inter-related,

and the air input can therefore be directly proportioned to the gas flowing through the plant. A regulator with a calibrated dial can be adjusted so that the air injected is maintained at any predetermined ratio between the range of 2 to 5% of the gas flow.

A glazed cupboard housing six double column pressure gauges is mounted on the house wall above the valve platform. In similar positions there are five dial thermometers opposite the respective purifiers connected by capillary tubing to the outlet valves. One Kent RTE/IT gas flow transmitter is connected to the orifice plate in the gas outlet main, and serves indicators and recorders elsewhere in the works. Check on air input is obtained by a Kent RTE/CID flow recorder fixed on the wall nearby the blowing equipment.

By means of the instruments, therefore, the gas flow through the stream is under remote and local supervision, and the air injection under local supervision and automatic control.

The entire plant is well equipped with all necessary safety guards, handrails, flameproof gear, &c., and has been approved by H.M. Inspector of Factories since it has been completed.

COKE RESEARCH CONFERENCE

PRESSURES DEVELOPED BY BRITISH COALS DURING CARBONIZATION

A CONFERENCE of the British Coke Research Association at the Royal Institution on Dec. 15 discussed a report on the pressures developed by British coals during carbonization, prepared by its Pontypridd Test Plant Committee. The Chairman of the Association, **Mr. Ralph Alsop,** C.B.E., presided and said that the work they were to discuss was an excellent example of the application of academic principles to industrial purposes. An abstract of the report was given in the 'JOURNAL" of Dec. 22.

Introducing the report, Dr. **W. Idris Jones,** Director-General of Research, National Coal Board, who was Chairman of the Pontypridd Committee, said that the work had occupied their attention for two years. Efficient carbonization was important to the coal, gas, iron and steel, and the chemical industries. Coals should not be used for carbonization if they were liable to damage the walls of the oven. The Association would be instrumental in saving a considerable sum of money every year if it could prevent the use of dangerous coals for carbonization and have them allocated to more appropriate purposes, or blend them to curb their swelling properties. The information in the report would be valuable to the N.C.B. in enabling it to produce the coals which could be best used. Mentioning the name of several firms and individuals who had co-operated in the work, Dr. Idris Jones said that seldom had such a wealth of analytical detail been embodied in a single report. It had long been known that certain coals were liable to damage the walls of ovens during carbonization and many attempts had been made to devise tests to ascertain this tendency. Earlier work did not go further than an attempt to classify coals as safe or dangerous, but, working on the lines of Russell, the Pontypridd Committee had tested a wide range of coals under conditions similar to actual working conditions, with a moveable wall oven.

Coal Survey's Part

Mr. **D. Hicks,** Director of Scientific Control, National Coal Board, spoke of the part played by the Coal Survey Organization in the work. The apparatus used was standard and the variable was the type of coal used. The main task, therefore, had been to make a selection of coals and to examine them in such a way that they could confidently predict the behaviour of these types during carbonization.

The Committee had started with the broad idea that the lower volatile coals might be those which developed pressures. They gave anxious thought to the selection of samples, bearing in mind that coals varied not only laterally through the seams but also vertically. The selection of coals came mainly from South Wales, Yorkshire, and the Durham-Northumberland coalfield, but coals from Kent were tested for check purposes and from the Bristol area because of the importance of this region's production to the gas industry. Coals from 13% to 36% volatile matter had been tested, moving up in stages of 15%, 19%, 23%, and so on. Points of sampling were fairly uniformly selected to give information on the coals at present produced in the South Wales fields and those that would be produced in 30 or 40 years' time.

Mr. **N. L. Franklin,** University of Leeds, who, as the then Chief Scientific Officer of the British Coke Research Association, was in charge of the tests at Pontypridd, then presented a review of the work that had been done. He described the process of the tests and the moveable wall oven which had been built to carry them out. It was suggested that coals not developing pressures of more than 2 lb./sq.in. when carbonized in the test oven would be suitable for use in industrial top charging practice. This conclusion was supported by American experience, but one could not say from this that it was impracticable to carbonize coals showing more than 2 lb./sq.in. pressure.

Despite certain limitations the work did provide an answer to the problems of dangerous coals, but further industrial experiment was necessary. Nevertheless, it had been possible to make indications about the dangerous qualities of coals, and the possibilities of blending them to reduce dangers in carbonization. The report also indicated the lines on which further effort might profitably be directed.

Comparing the work at Pontypridd with contemporary American developments, Mr. **T. C. Finlayson,** Deputy-Chairman, Woodall-Duckham Company, said that at the present time, when coke for the steel industry was in short supply, and when the construction cost of coke ovens was high, a long uninterrupted life for ovens was necessary. It was therefore both natural and logical that the British Coke Research Association should give consideration to the question of the pressures developed by coal during carbonization. The possibility of excessive pressures in a charge damaging the walls of the coke oven seemed to have been first mooted in 1920, since when it had become increasingly important. From the point of view of convenience, a small-scale laboratory test was to be preferred, but a large amount of money depended on the indications given by the tests, so that the conditions of a large-scale oven had to be reproduced. Existing laboratory tests fell short of this ideal. Without claiming that the Pontypridd wall was completely efficient, it did appear to meet the need more completely than any other apparatus.

Of recent years, three-part blends had been favoured, consisting of low, high, and medium volatile coals. The low volatile coals were recognized as dangerous in themselves, and the main problem was to determine accurately whether any blend would cause damage to the oven. It was the practice in America to carbonize unwashed coals, resulting in a tendency to charges of a higher bulk density than those resulting from the use of washed coal in Great Britain. The moveable wall oven had been increasingly adopted on American coke oven installations. Several operating companies had installed the moveable wall oven to control the working of the plant. The majority of users and designers employed the moveable wall oven as a routine apparatus in deciding whether blends of coals could be regarded as safe for commercial use. The Committee had preferred to study the results of an investigation on the swelling pressures of blends of coal in which they were interested. They believed that expansion tests should be made on air dried coal in order to simulate the maximum density of any bulk charge. For safe operation the expansion pressure of the coal charge should be controlled by limiting the percentage of low volatile coal and the addition of moisture should be used only as a factor of safety.

The conclusions of an investigation carried out by an independent American operating company agreed closely with those of the Pontypridd report. The Committee had approached the problems from practical and wider scientific angles. This was an achievement which showed the work's true value.

Contradictory Results

An appraisal of the work was given in notes prepared by Mr. **D. T. Barritt,** Director, Simon-Carves, Ltd., in notes read for him in his absence in America by Dr. J. Hamilton. Mr. Barritt said that many laboratory tests for assessing the swelling pressures of coals had been developed in the past which, while not being completely reliable, had certainly been helpful to plant operators. The difficulty with these laboratory tests was that plant designers, operators, and coal producers were unwilling to make expensive alterations on the basis of tests which had not been proved completely reliable. Such uncertainty might result in the operators either not using particular coals at all or only using them in safe blends. There was, however, no doubt that such a policy, while unquestionably right in the circumstances, limited the use of much safe coking coal. For this reason, a universally accepted test was required, and the Committee hoped that the Pontypridd work would prove a step forward in this direction. The moveable wall at Pontypridd was close enough to normal working practice and might help to obviate the difficulties caused by laboratories using small-scale tests reporting differently on the same coals.

Mr. Barritt suggested an extension of the work by trying out coals in actual practice on the basis of the Pontypridd results. This could be done by building a dummy oven at the end of a battery. Secondly, a most necessary step was to find a small-scale test based on the moveable wall oven performances. This was necessary because plants might not be able to afford either the time or the money needed by the large-scale tests.

Gas Stockholders

Regulations concerning the appointment of stockholders' representatives under the Gas Act, 1948, come into operation on Dec. 31. Stockholders' representatives for companies are to be appointed by holders of securities at meetings called under the regulations.

Stockholders' representatives for other bodies are appointed by the Minister of Fuel and Power, who also appoints in the case of a company where holders of securities fail to make their appointment by the due date. Notice of the appointment of any stockholders' representative not appointed by the Minister is to be given to the Minister.

The Minister will keep a list of all stockholders' representatives appointed, which will be available for inspection by any person concerned on application to him at 7, Millbank, S.W.1.

The regulations lay down the procedure for calling and holding meetings of holders of securities, together or by classes. Copies of the regulations (Statutory Instruments, 1948, No. 2709, The Gas (Stockholders' Representative) Regulations) are obtainable from H.M. Stationery Office, price 2d.

Johannesburg Results

The annual report of the City of Johannesburg Gas Department shows that the total production of gas in the year ended June 30, 1948, was 1,626,754,500 cu.ft., an increase of 7.63% over that in the previous year. Of this about 1,300 mill. was made in 70 Glover-West vertical retorts and 315 mill. in the carburetted water gas plant. The record quantity of 5,824,680 cu.ft. was distributed on June 30, 1948, an increase of 13% over the corresponding day of the previous year. It was necessary during the first eight months of the year to curtail the acceptance of new consumers owing to shortage of gas-making plant but the situation was eased after Mar. 17, when 16 more vertical retorts were completed and put into commission with waste-heat recovery plant. At the same time coal and coke handling plant was extended and additional auxiliary plant consisting of condenser, exhausters, tar extractor, and ammonia washer was brought into use, tar and liquor wells and water softening plant being also completed. This additional plant made available a further daily capacity of 1,800,000 cu.ft. to meet the demand from new consumers.

Gas storage, which had been no more than 3 mill cu.ft., will be increased to 6 mill. by the additional gasholder which should be ready for gas by the end of 1948. Work has commenced on the installation of gas-drying plant to be placed after the holders to deal with condensation troubles in mains and services. The capacity of this plant, which will use calcium chloride as the drying medium, will be 8 mill. cu.ft. per day.

Tar is dealt with in a new Wilton continuous distilling plant, in addition to which there are four pot stills used for rough distillation work. The output of tar in the year was 1,025,543 gall. A further agreement, for a period of three years, was entered into, through the City Engineer's Department, with the South African Iron and Steel Industrial Corporation, Pretoria, for the exchange of 35,000 gall. per month of crude gas-works tar for that Company's refined product. The balance of the output of crude tar was treated in the distillation plant for the production of 28,004 gall. of dehydrated tar, 6,584 gall. of light oil, 46,156 gall. of carbolic oil, 85,471 gall. of creosote oil, 122,902 gall. of anthracene oil, 185,150 gall. of pitch, 88,954 gall. of tar oil and 20-25% cresylic creosote, 209,031 gall. of wood preservative creosote, 26,106 gall. of black varnish, 3,926 gall. of disinfectant, and 3,600 gall. of tram curve grease. With the exception of pitch there has been no difficulty in disposing of these distillates.

Further development of the distribution system has been carried out. In addition to the renewal of corroded mains and old services, a net increase of 7.284 miles of main (from 2 in. to 14 in. diameter) has been laid, bringing the total length to just under 471 miles. The Department now serves 15,420 main gas consumers, an increase of 267, in addition to which there are many sub-consumers in blocks of flats and similar buildings.

Combustion Testing of Appliances

The general method of testing flue gases for the presence of carbon monoxide has long been the iodine pentoxide, or Vandaveer, method. This has been described in full in B.S.717, but the Committee which has been working on the revision of this specification is now proposing to include a number of other methods in addition. Most of these methods, although less "standard," are considerably more convenient than the Vandaveer apparatus.

One of the newest methods of detecting and estimating traces of carbon monoxide is the silica gel pallado-sulphite tube. If a sample of flue gases is aspirated at a prescribed rate through these tubes for two minutes, a dark stain is produced the length of which provides an accurate estimation of the amount of CO present. Naturally this figure can only be relied upon if the rate of flow and the time of test have been precisely adjusted, and a double aspirator designed by Mr. L. T. Minchin is now being marketed which enables this to be achieved simply and easily.

In this apparatus, which is made of stout sheet copper, two chambers are provided and water can be made to flow from one to the other at the prescribed rate. When one chamber is empty it is only necessary to invert the apparatus to enable one to recommence operation without any refilling. The chambers are provided with liquid-level gauges marked directly in minutes; in this way timing of the experiment is possible without even the use of a watch, and one can be sure that the sample is being drawn in at exactly the right rate.

Once a stain has been obtained, it is a simple matter to measure the length of the darkened portion, and by comparing this with a table on the outside of the box a reliable analysis for CO is obtained.

The tubes and the double aspirator are both being sold by Combustion Instruments, of 6, Basil Street, London, S.W.3, from whom further information can be obtained. The method is so simple and quick that reliable results can be obtained in a total time of only three or four minutes. The apparatus is so portable that it can easily be used outside the test-room, and is quite suitable for use on a consumer's premises.

Other applications in the gas industry will be apparent; it can be used for detecting dangerous concentrations of CO in the atmosphere of a working-place, and is particularly useful for testing the air in purifier houses, water gas plant, and manholes.

Chemical Handbook

The Association of British Chemical manufacturers has produced the 1949 edition of *British Chemicals and Their Manufacturers*, comprising up-to-date information regarding the manufacturers of all types of chemicals —heavy, fine, pure, &c. The previous edition was published in 1946 and an introductory note in the 1949 edition indicates that it is hoped to produce the next in 1951. The book is published by the A.B.C.M. with a view to giving purchasers information on the products made by members of the Association, which is not itself a trading concern and makes no profit on any business transacted by its members. All members of the Association are *bona fide* British manufacturers of chemical products and every member has declared that he is the actual maker of the products against which his name is shown. Where intending purchasers have any difficulty in obtaining a particular product they are asked to write to the Association. A copy of the book will be sent *gratis* to any enquirer writing to the Association's headquarters on business paper or giving other genuine indication of being likely to put the directory to good use as a purchaser of chemicals.

H.M. Stationery Office has opened a new Midlands branch for the sale of Government periodicals. Its address is 2, Edmund Street, Birmingham, 3.

Coles 6-ton self-propelled crane —model 8502, is built for duty of 6 tons at 7 ft. 6 in. radius and proportionally lighter loads at a greater radius up to the maximum of 36 ft., at which half a ton can be lifted. The four independent motions—hoisting, derricking, slewing and travelling—are each driven by separate electric motors, which receive current from a specially designed variable speed generator, coupled to a petrol or diesel engine, as required. The driver's cab at front of superstructure is fully enclosed and affords full view of working area. Limit switches, are also provided to prevent overwinding and overlowering on the hoisting motions. Automobile type steering and driving axles specially built for crane service are fitted. Pneumatic or solid tyres can be fitted as required. Unladen weight is 12½ tons and travelling speed up to 5 miles per hour unloaded.

Coles Mobile Cranes are manufactured by Steels Engineering Products, Ltd., of Sunderland; Head Sales Office: (Dept. 102), 14, Berkeley Street, London, W.1.

GAS STOCKS AND SHARES

Stock markets ended the holiday week mainly firm, although inactive, with the general level of industrial securities higher than for the past month, and British Funds up to the average of the early part of the previous week. After falling to 3,870 on the last day of business before Christmas, the lowest since July, 1944, dealings on the London Stock Exchange averaged 4,601 during the three days ended on Thursday evening. The gilt-edged section benefited from end-of-the-year purchases by some of the large financial institutions.

Business in gas stocks was unusually quiet, particularly on Wednesday, when only 19 bargains were recorded, the lowest number for some years, bringing the three days' average down to 32, compared with 60 per day a year ago. Montevideo Gas and Dry Dock dropped five points, and Primitiva Holdings finished 6d. lower at a middle price of 9s. 6d. All the changes in home gas undertakings were in an upward direction. The week's rises and falls in gas stocks were as follows:

OFFICIAL LIST

Brighton &c., 5 p.c. Perp. Deb. (xd Dec. 15)	118 —123	+ 2
Commercial, Ord....	91 — 96	+ 1
Imperial Continental	111 —116	+ 1
Mid Southern Utility, "A" Cons.	102 —107	+ 2
Montevideo Gas & Dry Dock ...	95 —100	— 5
Newcastle & Gateshead, Ord. ...	24/9—25/9	+ 3d.
Primitiva Holdings, Ord.... ...	8/6—10/6	— 6d.
South Metropolitan, 3 p.c. Perp. Deb. (xd Dec. 15)	82 — 87	+ 1

Quotations on the London Stock Exchange

When last ex-Dividend	Dividends Interest. Total for Year %	NAME.	Quotations Dec. 30
Sept. 15	4	Alliance & Dublin Cons. Ord.	21/6—23/6
Nov. 3	5	Asscd. Gas & Water U'd'tgs Ord.	22/ —23/
,,	6	Do. Deferred	22/3—23/3
Sept. 1	4½	Do. 4½ p.c. Red. Cum. Pref.... ...	20/ —21/
,,	4	Do. 4 p.c. Red. Cum. Pref.	19/ —20/
,,	4	Do. 4 p.c. Irred. Cum. Pref.... ...	18/3—19/3
Aug. 18	7	Barnet Ord. 7 p.c. max.	153—158
Aug. 16	5	Bath Cons. Ord. 5 p.c. basic	104—109
Sept. 17	6½	Bombay, Ltd., Stock	35/- -40/-
Aug. 18	8½	Bournemouth Std. 5 p.c. sliding scale ...	163—169
,,	7	Do. 7 p.c. max. div.	153—158
,,	4	Do. 4 p.c. Pref.	96—101
,,	6	Do. 6 p.c. Pref.	124—129
,,	3½	Do. 3½ p.c. Red. Deb.	95—100
Dec. 15	4	Do. Perp. 4 p.c. Deb.	96—101xd
Aug. 18	5·35	Brighton, &c., 5 p.c. Std. Cons.	103—108
,,	6·3	Do. 6 p.c. Std. Cons.	112—117
Dec. 15	5	Do. 5 p.c. Perp. Deb.	118—123xd
Aug. 4	5	Bristol, Gen. Cap. 5 p.c. max.	112—117
Dec. 15	4	Do. 4 p.c. New Deb. Red.	94— 99xd
Sept. 29	7½	Brit. Gas Light Ord.	127—132
June 16	5½	Do. 5½ p.c. 'B' Cum. Pref.	108—113
Dec. 15	4	Do. 4 p.c. Red. Deb.	93— 98xd
Aug. 4	10	Cambridge U. & T. Orig. 10 p.c. Cons. ...	190—200
,,	5	Do. 5 p.c. Cons. 'C'	95—100
,,	7	Do. 7 p.c. Cons. 'B.'	135—140
Nov. 3	4½	Cape Town, Ltd., 4½ p.c. Cu. Pf.	17/ —19/
Oct. 13	6½	Cardiff Con. Ord.	118—123
Mar. 10	5	Cheltenham, 5 p.c. basic Cons. Ord. ...	102—107
Dec. 15	4	Do. 4 p.c. Perp. Deb.	94— 99xd
Aug. 4	5½	Chester United Ord.	107—112
Nov. 3	7	Colombo Ltd., Ord.	27/ —32/
,,	7	Do. 7 p.c. Pref.	22/ —24/
Sept. 29	5	Colonial Gas Assn. Ltd. Ord.	16/ —18/
,,	8	Do. 8 p.c. Pref....	24/6—26/6
Aug. 4	5	Commercial Ord.	91— 96
Dec. 1	3	Do. 3 p.c. Deb. Perp....	72— 77
Aug. 18	5	Do. 5 p.c. Irred. Deb....	107—112
,,	6	Croydon sliding scale	120—125
,,	5	Do. max. div.	102—107
,,	4	Do. 4 p.c. Irred. Pref.	95—100
Dec. 15	4	Do. 4 p.c. Perp. Deb....	94— 99xd
,,	5	Do. 5 p.c. Perp. Deb....	119—124xd
Aug. 18	8	Derby Cons. Ord.	134—139
Dec. 15	4	Do. 4 p.c. Red. Deb.	92— 97xd
Aug. 4	5	East Hull Ord.	93— 98
Aug. 18	5	East Surrey 'B,' 5 p.c.	98—103
,,	6	Do. 6 p.c. Cum. Pref....	117—122
Dec. 15	5	Do. 5 p.c. Irred. Deb.	117—122xd
Sept. 1	6⅞	East Wight Cons. Ord.	108—113
Aug. 18	5	Eastbourne 'A'	101—106
,,	3½	Do. 'B'	98—103
Nov. 17	5	Gas Consolidation Ord. 'A'	20/6—22/6
,,	5	Do. Ord. 'B'	20/6—22/6
,,	4	Do. 4 p.c. Red. Cum. Pref.	17/6—19/6
Aug. 4	5	Gas Light & Coke Ord.	22/9—23/9
,,	3½	Do. 3½ p.c. max.	78½— 81½
,,	4	Do. 4 p.c. Con. Pref.	99—102
July 14	3½	Do. 3½ p.c. Red. Pref....	97½—100½
Dec. 1	3	Do. 3 p.c. Con. Deb.	85½—88½
,,	5	Do. 5 p.c. Deb.	104—107
,,	4½	Do. 4½ p.c. Red. Deb.	104—107
Sept. 1	3½	Do. 3½ p.c. Red. Deb....	94— 99
Aug. 4	5	Gloucester Cons. Ord.	94— 99
Feb. 11	4	Great Yarmouth (8½ p.c. max)	13½— 14½
Sept. 1	7½	Guildford Cons. Ord.	132—137
Aug. 18	5	Hampton C't, 5 p.c. Cons. Ord.	95—100
Sept. 1	5	Hartlepool G. & W. 5 p.c. Ord.	94— 99
Oct. 13	6	Hastings & St. L. (5 p.c. Std.)	100—105
,,	5	Do. (3½ p.c. Std.)	80— 85
June 16	7½	Holyhead & N. Wales Ord.	20/6—22/6
Sept. 15	5	Hornsey 3½ p.c. Std.	89— 94
,,	6⅞	Do. 5 p.c. Std	110—115
May 19	8¾	Imperial Continental Cap.	111—116
July 14	3½	Do. 3½ p.c. Red. Deb....	100—105
Sept. 1	7½	Lea Bridge Co., Cons. Ord....	134—139
Aug. 4	5½	Liverpool 5 p.c. Ord.	121—126
Sept. 15	7½	Luton Cons. Ord. 'A'	152—157
,,	6½	Do. Ord. 'B'	115—120

When last ex-Dividend.	Dividends Interest. Total for Year %	NAME.	Quotations Dec. 30
July 14	7	Malta & Med'n., 7 p.c. 1st Pref.	110—115
,,	7½	Do. 7½ p.c. 2nd. Pref....	110—115
Aug. 18	5⅗	M.S. Utility 'A' Cons.	102—107
,,	3⅜	Do. 'B' Cons.	70— 75
,,	5⅗	Do. 'C' Cons.	102—107
,,	4	Do. 4 p.c. Cons. Pref.	96 —101
May 19	2	Montevideo, Ltd. Ord.	95—100
Aug. 4	5⅛	Newcastle and Gateshead Ord.	24/9—25/9
June 30	3½	Do. 3½ p.c. Perp. Deb.	93— 98
Aug. 4	8½	Newport (Mon.) Cons.	98—103
Dec. 15	5	Do. 5 p.c. Perp. Deb....	110—115xd
Sept. 29	6½	North Middlesex 6 p.c.	123—128
,,	5	Do. 5 p.c. Pref.	105—110
Aug. 18	5	Northampton Cons.	104—109
Aug. 4	9¾	Oxford, Cons. Ord.	205—215
Dec. 1	5⅛	Plymouth & Stonehouse Ord	111—116
,,	8½	Do. Addl.	14½— 15½
,,	7½	Do. New	13½— 14½
Sept. 15	5	Do. 5 p.c. Deb. Perp....	118—123
Aug. 18	7½	Portsmouth & Gosport Cons.	147—152
,,	5	Do. 5 p.c. max.	102—107
Aug. 4	10	Preston 'A'	178—183
,,	7	Do. 'B'	125—130
June 24	46	Primitiva Holdings, Ltd. Ord.	8/6 —10/6
Dec. 15	6	Do. 6½ p.c. Red. Cum. Pref.	97—102xd
Aug. 18	5	Reading, 5 p.c. max.	97—102
,,	3½	Do. 3½ p.c. Red. (Non-Cum.) Pref....	94— 99
Dec. 15	4	Do. 4 p.c. Perp. Deb....	91— 96xd
Aug. 18	5	Romford, Ord.	110—115
Sept. 15	7½	Severn Val. Ltd. Ord.	22/3 -23/3
,,	4½	Do. 4½ p.c. Cum. Pref.	20/6—21/6
Sept. 1	6½	Sheffield Cons....	143—148
June 30	4	Do. 4 p.c. Red. Deb.	94— 99
Sept. 1	6	South East'n Gas Ltd. Ord.	22/ —23/
,,	4½	Do. 4½ p.c. Red. Cum. Pref.	20/9—21/9
,,	4	Do. 4 p.c. Irred. Cum. Pref.	19/—20/-
Aug. 4	5	South Metropolitan Ord.	102 —107
,,	6	Do. 6 p.c. Irred. Pref....	123 —128
,,	4	Do. 4 p.c. Irred. Pref.	97 —102
Dec. 15	3	Do. 3 p.c. Perp. Deb.	82 — 87xd
July 14	5	Do. 5 p.c. Red. Deb.	98 —103
Aug. 4	5	South Suburban Ord. 5 p.c.	112 —117
,,	5	Do. 5 p.c. Perp. Pref....	108 —113
,,	4	Do. 4 p.c. Perp. Pref....	93 — 98
,,	3½	Do. 3½ p.c. Red. Pref....	90 — 95
Dec. 15	5	Do. 5 p.c. Perp. Deb....	118— 123xd
Sept. 15	5½	South West. G. & W. Ltd. Ord.	19/—21/-
Aug. 4	5	Southampton Ord.	102 —107
Aug. 18	6	Sunderland Ord.	113 —118
Aug. 4	4½	Swansea Ord.	82 — 87
,,	5½	Do. 5½ p.c. Red. Pref.	100 —105
Sept. 15	7	Swindon Cons. Ord.	114 —119
Aug. 4	5	Tottenham Ord.	115 —120
,,	5	Do. 5 p.c. Pref.	108 —113
,,	5½	Do. 5½ p.c. Irred. Pref.	120 —125
Dec. 15	4	Do. 4 p.c. Perp. Deb....	95 —100xd
Oct. 13	6.85	Tunbridge Wells, 4 p.c. Sliding	122 —127
,,	7	U. Kingdom Ltd. Ord.	22/9-23/9
Nov. 17	4½	Do. 4½ p.c. 1st Cum. Pref.	22/ —23/
,,	4	Do. 4 p.c. 1st Red.Cum.Pref.... ...	19/ —20/
June 16	4½	Do. 4½ p.c. 2nd Non.Cum.Pf.... ...	19/ —20/
Sept. 15	3½	Do. 3½ p.c. Red. Deb....	93 — ⅜8
Aug. 18	6⅝	Uxbridge, &c., 5 p.c.Cap.	120 —125
,,	5	Do. 5 p.c. Pref.	107 —112
Dec. 1	5	Do. 5 p.c. Perp. Deb.	118 —123
Aug. 4	5	Wandsworth Cons.	118 —123
,,	4	Do. 4 p.c. Pref.	97 —102
Dec. 15	5	Do. 5 p.c. Irred. Deb....	121 —126xd
,,	4	Do. 4 p.c. Irred. Deb....	94 — 99xd
Aug. 4	5	Watford & St. Albans Ord.	117 —122
,,	5	Do. 5 p.c. Pref.	107 —112
,,	5½	Do. 5½ p.c. Pref.	120 —125
,,	5	Weymouth Ord. (5 p.c. Basic)	92 — 97
Aug. 18	10½	Woking District "A" Ord....	180 —190
,,	7.35	Do. "B" Ord....	127 —132
Aug. 4	7½	Wolverhampton Cons. Ord.	119 —124
Sept. 15	5	York Cons. Ord.	97 —102